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Special Articles

THE POINT OF VIEW IN MEDICAL INSPECTION OF SCHOOLS*

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I.—THE HUMANITARIAN.

I do not need to dwell on this. It appeals to you without comment. It is regrettable but true that many children are neglected, if not in one way, in another. This neglect may be due to many different causes, but always the children are the sufferers. It may be due to poverty, ignorance, prejudice, drunkenness, sickness, etc. Many children of very intelligent, kind and careful parents are neglected from lack of technical knowledge, or simple prejudice.

II.—CONSERVATION OF THE STATE'S GREATEST NATIONAL ASSET.

The school children of to-day, in ten to fifteen years, are the strength of the nation. Boards of Education should be able to say to every child at the close of its school days: "We have done our best by you; educated you and trained you, given you every opportunity to develop physically and mentally. You should now be an efficient citizen of the State." This fine physical and mental development, this efficiency which will enable it to take its place in the State, is the child's birthright as much as personal liberty. This should be the aim in medical inspection of schools. Necessarily, therefore, our work brings us in touch with all the great social problems that are occupying the minds of the best men and women of the world to-day. The urgent necessity of some systematic effort to preserve the health and develop the physique of the rising generation is constantly before us. Poor housing conditions, lack of light and ventilation, uncleanliness, ignorance of proper care of the body and of the laws of health, unwholesome and improper food and drink, the prevalence of venereal and other diseases are rapidly producing a degenerate race. This is so evident to the casual observer that the apathy among public men and the general public is most remarkable. Perhaps one of the greatest needs of the day is a thoroughly organized educational campaign on public and personal health matters. When we have thoroughly thrashed out the personal health equation and its necessarily close relation to public health, we will find a readier support for public health measures. It is bluntly charged that many of the evils of both our rural and city life are due to our own moral cowardice—that we will not discuss publicly things that are es-

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sentially personal but vital to child life—that we will not attack abuses because of personal or corporate interests.

Our work in the schools is a constant reminder of the science of eugenics. It brings before us the effect on child life of the social problems of high cost of living, the labor question, housing conditions, tenements, basement life, baths, water supply, garbage removal, sanitary conveniences, and general cleanliness: the so-called social evils, drunkenness, immorality and venereal diseases; control of prostitution and registration of venereal disease; regulation of the issuing of marriage licenses and the prevention of the marriage of the physically and mentally unfit, involving the question of the increasing national burden of the care of the insane, the idiot, the imbecile, the feeble-minded, and the debilitated child, the potential criminal; open places and playgrounds; the teaching of sex hygiene in our public and high schools; infant care, children's (between 14 and 16 years old) work certificates requiring a standard of education and physical fitness.

Teaching of Sex Hygiene.

Simmons College for Girls, Boston; Washington Board of Education has made it mandatory in public and high schools.

Leland Stanford University.

Darthmouth College, Norfolk, Mass.

Los Angeles High Schools.

III.—Preventive Medicine.

The great aim of medical inspection of schools should be preventive medicine, not curative. Treatment or procuring treatment must necessarily be a part, but education constantly teaching the laws of health should be our greatest work. This will give us the best national results. The home must be brought into close touch with the schools, or vice versa, whichever way you like to put it. Preventive medicine is the great work of the future. Immense sums of money are being spent on sanatorias, hospitals, homes for incurables, asylums, prisons, reformatories, but there is an immediate outcry, if money is asked for other purposes that are bound to decrease the present heavy national burden imposed by caring for the sick, the insane, imbecile, and the criminal. Preventive medicine will give national protection against disease, poverty, crime, and aggression.

IV.—Progress of Legislation.

The first legal decree establishing medical inspection of schools was passed in France in 1833 and was very tentative in its nature, ordering inspection of the cleanliness of the schools and a general oversight of the health of the children. Later, decrees enlarging the scope of the work were passed in 1879 and again in 1884. The first system of medical inspection of schools in the modern sense of the term was inaugurated in Brussels, Belgium, in 1874. Soon Germany, Switzerland, Hungary, Austria, Norway, Sweden (where the term "school physician" was first used), later Russia, England, Japan, and America undertook to establish more or less imperfect systems of medical inspection of schools.

In the United States of America the first system was established in Boston in 1894; in South America, the Argentine is credited with having a very complete and efficient system, providing for vaccination of school children, examination of sanitary conditions of buildings, visiting of sick children in their homes, prevention of contagious disease, delivering of scientific lectures and giving of free medical advice to teachers as well as pupils.

There is a national system established in England, Japan, and Switzerland; a state system in Massachusetts, and a provincial system in British Columbia, Canada, the first province to establish a provincial system in this country.

V.—Aims of Medical Inspection—What is Being Done.

The state looks upon its forests, fisheries, mines and cultivatable lands as its great natural resources, and enormous sums of money are spent in the effort to develop and extend these. Politicians, however, forget the children of the state, or are not seized with the importance of their health, nor do they seem to realize that the greatest natural asset of the state is the children.

The aim of medical inspection of schools is to give each child his alienable birthright, a healthy body and sound mind, and the duty of the state to give every child this opportunity, this first necessity of human happiness, this absolute necessity to make an independent living, is away beyond every other duty; more insistent than compulsory education, or the development of the country's natural resources. In the

strenuous life and keen competition of today, it makes little difference how bright a child is if it lacks the physical strength to stand the modern strain of business and professional life.

The state provides for the education of all children as a measure of self protection. Health and education belong hand in hand. This means that the existing educational agencies must ally with themselves expert medical officers who shall see that the health of children is conserved through the schools. This cannot be an incidental activity of some department, but must outrank all others in power, as it does in importance.

Medical inspection, then, aims at both the protection of the community and furnishing the physical conditions under which wholesome life can develop. It involves in this comprehensive aim the functions of both the departments of health and education.

Public schools are a public trust. When the parent delivers his child to their care, he has a right to insist that the child under the supervision of the school authorities shall be safe from harm and will at least be handed back to him in as good condition as he was at first. Not only has the parent the right to claim such protection, but even if he does not insist upon it, the child himself has a right to claim it. The child has a claim upon the state and the state a claim upon the child which demands recognition.

Education without health is useless. It would be better to sacrifice the education if, in order to attain it, the child must lay down his good health as a price. Education must comprehend the whole man, and the whole man is built fundamentally on what he is physically. Children are not dullards or defectives by the will of an inscrutable Providence, but rather by the law of cause and effect.

The exercise of the power to enforce school attendance would be dangerous if it were not accompanied with the appreciation of the duty of seeing that the assembling of pupils brings to the individual no physical detriment. When the subject is considered, both from the standpoint of the individual and from that of the state, the wonder is not that medical inspection is now being agitated, but rather that it was not long ago put into practice. Nor is the state, in assuming the medical oversight of the pupils in the public schools, trespassing upon the domain of parental rights and initiative.

The justification of the state in assuming the function of education and in making the education compulsory is to insure its own preservation and efficiency. In order that it may insure the efficiency of its citizens, the state through its compulsory education enactments requires its youth to pursue certain studies which experience has proved necessary to secure that efficiency. Individual efficiency, however, rests not alone on education or intelligence, but is equally dependent on physical health and vigor. Hence, if the state may make mandatory training in intelligence, it may also command training to secure physical soundness and capacity.

Work of Medical Inspection.

1. Detection of contagious disease. This is important, but not the most important part of the work.

2. Detection of other than contagious diseases. Reporting or treating the same.

3. Detection of physical defects, such as poor sight or hearing, enlarged tonsils and adenoids, and so forth, and the effort to induce parents to have these defects removed.

4. Detection of pulmonary tuberculosis and the effort to have those children properly cared for. This is beginning at the right time in the effort to fight the "White Plague."

5. Examining of anaemic, poorly nourished and poorly developed children, with some special effort in their behalf, such as the formation of open air classes.

6. Examination of children behind in their school studies, with some special effort in their behalf, such as the establishment of ungraded classes.

7. Examination of mentally defective children in an effort to measure the scale of intelligence of each child and determine its mental status.

8. The making and proper filing of records of the physical conditions of all school children.

9. Oversight of sweeping and a general cleanliness of the school, heating, proper lighting and efficient ventilation of class-rooms. The purity of the air in school class-rooms is of vital importance to both physical and mental development of the child.

10. Examination of school premises and a watchful oversight of the sanitary conveniences.

11. Educational aspect—teaching the laws of health in the school and in the home to the child and to the parent, the importance of efficient ventilation, proper drink, wholesome and nourishing food, personal cleanliness, baths, regular hours of sleep, rest, work, open air exercise, etc.

12. Teaching the lessons of morality by imparting a knowledge of the right care of the body and inculcating the importance of a healthy mind, as well as that of a healthy body.

THE PREVENTION OF TUBERCULOSIS IN THE COUNTRY

BY DR. H. G. ROBERTS, GUELPH, ONT.

If we can properly solve that question in rural municipalities it will only be a short time until consumption is a spectre of the past. The proportion of tuberculosis between country and city life is as 11 to 16, due mainly to better conditions of living. In the country there is less dust and dirt; the air is purer; the housing conditions are better; the chances of infection are less, and good wholesome food more easily obtainable. The wonder to me is that the proportion is not less. The question of prevention of tuberculosis in the country in the light of our present knowledge must be wholly educative. The medical profession know that they have nothing to offer in the way of drugs that is at all curable in this disease, but they have learnt that a great proportion of incipient cases can be cured by rest, good food and fresh air; they have learnt that consumption is but the expression of faulty living and, in order to prevent it, the people must be taught how to live. Taught to depart from the old style of closed up houses and to open their doors and windows both by day and night to fresh air. Taught to make every house a sanitarium; and the question is who is going to teach them. Societies for the prevention of tuberculosis, our Provincial Board of Health, tuberculosis exhibits passing from cities to towns all have done much to educate the people, but I claim the great mass—the dwellers in the country—have not been reached. I have a plan to submit to this meeting which, if carried out, and I see no obstacles in the way of doing so, will, I am convinced, very materially lower the death rate, but before doing so will cite what we have attempted in Guelph Township. In 1911, our Board sent our secretary and myself to a tuberculosis conference in London and, as a direct result of attending that meeting, we were awakened to the fact that we, as a board of health, were doing absolutely nothing to help the afflicted. We were sitting with folded hands and allowing patients to go down to death without making an effort to help them. We resolved to do what we could. When we returned we called a meeting of all the trustees and teachers in the township and got their opinions as to the best time to hold a meeting in their school house. We appointed a night when we would be at each school and asked the teachers to get up some little programme of music, recitations and singing. I read a paper on tuberculosis at each meeting and, incidentally, gave them a talk on sanitary matters. The slogan of the paper was, "Every House a Sanitarium." The result was just splendid; we had crowded meetings every night; the people manifested a great deal of interest in the subject and the discussion was quite free. Many were surprised to learn that consumption was not hereditary; they, like thousands of others, had been going through life with a Damocles sword hanging over their heads, making their lives miserable just because some relative had died of tuberculosis. After the meetings were over the local press very kindly published the paper. Now what we have attempted to carry out in Guelph Township I would like to see carried out all over Ontario. Suppose we start on the 20th of January next—just after the Christmas holidays—and hold an educative campaign all over the province. We have the proper organization in the boards of health in each municipality and the

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medical health officers to do the work. Men, by all means, let us get busy. If a medical health officer has not the time to prepare a paper let the Provincial Board supply him with one; the same paper would do in all the schools. If the townships were large, the M. H. O. could get a brother practitioner to help him. The cost, which would not be great, could be borne by the municipality. Now, gentlemen, there is nothing chimerical or impracticable in this proposition and if we are in dead earnest to help suffering humanity and stamp out this great White Plague, let us make a great collective effort and teach the people how to live. I feel convinced if our Provincial Board and, through them, our District Officers of Health, will take this matter up a great deal of good can be accomplished. The latter might call a meeting of the medical health officers in their districts and get them thoroughly organized for the work. A live medical health officer with a desire to convey knowledge on such an important subject will be worth a bushel of literature. Any educative work to be effective should be continuous, and this educative campaign should be followed up by some good work in our public schools to teach the young how to avoid tuberculosis.

I may say that since the Honorable Mr. Hanna's excellent Bill of Health has become law and consumption must be reported, we are in a much better position to deal with the matter. The medical health officer of the township has a free hand and can do much to help the afflicted and safeguard other members of the family. In our township we propose having a blank map of the township at our place of meeting and marking with red ink the farms where tuberculosis exists; this will be a means of affording much valuable information.

In conclusion I will again express the hope that my suggestion be acted upon. We must create a new order of living. Better hygienic conditions must prevail in the homes. The old idea of having the windows nailed down for the winter must be a thing of the past. In this way many lives will be saved, the weakly will be fortified and the measure of humane life and happiness be greatly increased.

THE DENTIST AS A SOCIAL WORKER

BY A. W. THORNTON, D.D.S.

Words are socuriously ro-related, that the use of one word, or the expression of one action, consciously or unconsciously, suggests another word, or implies another action.

So when we speak of a dentist, we have a mental picture not only of a man or woman, who has pursued a certain course of training, and renders a particular kind of service to the community, but we have, too, a definite idea in our minds of the kind of service such an individual renders.

In the consideration of this subject, it is the work or service that is of paramount importance, not the individual who performs the work or renders the service, though the two are inseparable.

It would be a criminal waste of time to discuss "Socialism," in any form whatever, though the temptation to do so is very great. But one or two axioms of political economy may not be amiss, and may serve as a foundation or starting point for the paper. It will, I think, be admitted by all that "as mere bodily sustenance is the first condition of life for the individual, so the primary aim of life is the establishment of a tolerable human existence." In other words, if man is to live, life should be made as enjoyable as possible.

But "no man liveth to himself." Social life to-day, in civilized countries is exceedingly complex, and if harmony is to prevail, and if "the greatest good to the greatest number" is to come anywhere near to being an accomplished fact, each must contribute to the welfare of all, or as the formula of the canon of production and distribution runs, "from everyone according to his abilities, to everyone according to his needs."

That life to-day is more strenuous than ever before in the world's history is a fact, heard from every platform, and read on every printed page.

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Out of this strenuous life have grown many "sayings" or aphorisms, one of the most recent, and most characteristic of the age, being, "Maximum efficiency." With this thought in mind, every effort is put forth to show the greatest possible "output" with the least possible expenditure of time, energy, and capital.

The machine which will not stand the strain must be relegated to the scrap-heap. The human machine is no exception to the rule. "Always at my best" must be the motto of the one who hopes to "keep in the race" under existing conditions.

The human machine, and the mechanical contrivance have this in common; the energy which enables them to accomplish their work must be supplied them from some outside, independent source. No perpetual motion contrivance, mechanical or human, has yet made its appearance, possessing inherent energy, to carry on its own peculiar activities.

Just as our factories must have power from coal, water power or other source of supply, so our bodies must have energy, and this is furnished by the daily food supply.

This material for physical energy must be properly prepared for its passage through the alimentary canal, and the alimentary canal itself must be kept in the best possible condition to furnish the nourishment which the whole body requires, each section of the canal performing its own special function in a normal healthy manner.

The mouth and teeth being the entrance to this canal, are without doubt, its most important parts.

I need not dwell on the importance of the part played by the mouth and teeth in the process of digestion.

What I do wish to lay stress upon is the condition of the teeth and oral cavity, and the effect of these conditions on the health, happiness and possibilities of service, of the individual.

I will describe but three conditions of the oral cavity.

1. Where the teeth are all in place, without cavities, and the gums and mucous surfaces healthy.

2. Where the teeth are without cavities, but the gums and mucous surfaces are filthy and diseased.

3. Where the teeth have cavities, and the gums and mucous surfaces are filthy and diseased.

The first condition (where the teeth are all in place, without cavities and the gums and mucous surfaces healthy) is of course very rare.

The reasons for this are not hard to find. No better culture bed for bacteria could possibly be found than the human mouth. The temperature is always right, moisture is always present, convenient incubators and abundant food supply are always to be found in the uneven surfaces and interstitial spaces of the teeth.

What wonder, then, if tooth decay and diseased mouth conditions are almost universal.

The fact is then that we find the second and third conditions to be almost universally present, that is, the teeth may be free from decay but the gums and mouth dirty and diseased, or the teeth may be decayed and the diseased condition of the mouth may also exist.

Bear this thought in mind, it is rare indeed, to find healthy gums and mucous surfaces where there are many badly decayed teeth. The reason for this is so apparent that I will not need to enlarge upon it.

The questions, however, that we are concerned with here are,

(1) What are the results of the conditions that we know to exist, and

(2) What can be done to remedy these conditions.

The first condition we note as a result of decayed teeth is human suffering, and God knows there is enough suffering that cannot be prevented, without having a single pang that might have been prevented.

I know of nothing more pitiable in connection with my practice, than to have a mother come in with a little child suffering from a decayed tooth: pitiable not only because of the extreme suffering at the time, but pitiable because it is so nearly impossible to do anything for the majority of small children at the acute period of the ailment.

In the next place, where the teeth are decayed, it is manifestly impossible that the body should be properly nourished. The food cannot be properly masticated, the salivary glands fail to perform their share of

digestion, the stomach and the remaining portions of the intestinal tract are overburdened, the system's balance is disarranged, and physical, mental, and I believe moral suffering, are bound to ensue.

I wish it were possible to make all parents understand how absolutely necessary it is that the first teeth should be kept in good condition. The general feeling is that the condition of these so-called temporary or first teeth is a matter of very little importance, as they will soon be lost anyway.

But if you will just stop to think for a moment, you will realize that the growing boy or girl must assimilate food, sufficient not only to accomplish the physical work of the day, the endless running and jumping and skipping, but provision must be made too for the growth of the body going on so rapidly during the years of physical development. How necessary, then, that all the organs of mastication, digestion and assimilation should be kept at their best.

But there is a phase of this question that has been almost entirely overlooked in the past, a side to it that is of stupendous importance to the social life of the nation. Mention has already been made of the ideal conditions found in the mouth for the production of those germs which produce certain diseases.

In the average mouth, where there are decayed teeth, many varieties of these disease producing germs may be found, among others the germs of pneumonia, diphtheria and tuberculosis.

The result is that these diseases manifest themselves just as soon as there is a lowering of the vitality; or they are communicated to others, and thus an epidemic is started, and parents wonder how their children "Caught it." In my own practice I have seen several most lamentable cases of tubercular glands, the tubercle bacillus finding a path to the glands through carious teeth, and alveolar abscesses.

I heard Dr. Evans, when Commissioner of Public Health in Chicago, say that for a long time they battled without success against diphtheria and scarlet fever. Patients would be discharged from the isolation hospital, apparently cured, and the disease would make its appearance in other members of the family, after the return of a child from the hospital. To the astonishment of the physicians, it was found that the germs of the disease were present in the mouth, teeth and tonsils, even after the patients were ready to leave the hospital. When the discovery was made, the remedy was not hard to find. The teeth and mouth were made clean, carious teeth were filled and the conditions were materially bettered.

Speaking of mouth conditions, Dr. Osler, in an address before the Royal College of Surgeons in London, said, "If I were asked to say whether more physical deterioration was produced by alcohol or by defective teeth, I should unhesitatingly say, defective teeth."

The mouth conditions of Britons not a national disgrace, are certainly a national calamity.

During the Boer war seventy per cent. of the men who presented themselves for enlistment at one of the recruiting stations, were rejected because of bad mouth conditions.

The able editor of the Toronto Globe, discussing the social condition of the British people, drew special attention to their "shrunken faces, and toothless, bloodless gums."

I have wondered sometimes whether the toothlessness was the cause or the effect of the social conditions.

Booker T. Washington says that a tooth brush is a mighty agency in the social uplift of his people.

Pride in one's personal appearance is a mighty asset in social regeneration, and certainly one of the most beautiful features of the human race is a good set of teeth, well kept.

At the present time, the campaign for mouth hygiene is almost world-wide. Some experiments of the most interesting character have been carried on in connection with this campaign.

In Cleveland, forty boys and girls, nearly all children of foreign-born parents, and from the most congested parts of the city, were formed into a class. The dentists of the city volunteered to put the mouths of these children into the proper condition. The children were taught what to eat and how to eat it.

Psychological tests of these children were made by university professors, at the beginning of the experiment. The treatment and the tests were kept up for ten months. The gain in mental efficiency was almost

100 per cent. But the mental gain was far from being all that was accomplished. The physical and moral improvements were just as marked. The whole character of these forty children seems to have undergone a marvellous change for the better.

The mouth conditions of these forty children were similar to the mouth conditions of the vast majority of the children of all our public schools. What was done for these children might be done, and should be done, for all the children of the nation.

There is another side of the question to which I would like to draw attention. Last week at the Exhibition, I noticed the splendid exhibit of the Health Department of the Ontario Government. I saw all the dolls representing the babies that die annually in the province. I saw the mechanical contrivance with the grim reaper "death" —and all the little graves, illustrating the awful fact that one child out of every four born in Ontario died in infancy, and that many of these deaths should have been prevented.

Just across the aisle from that exhibit, less than ten feet away, was an array of nursing bottles, and nurses showing how these bottles might be kept clean and sweet. And there were directions how the milk (cow's milk) should be treated so that the babies might have a chance for life. But why so many bottles? Cow's milk is for calves, not for babies. But when I thought of all the mothers, whose teeth and mouth conditions are such that "horrible" is the only word that describes them—When I thought of the number of times I have said to a mother, "Are you nursing your baby?" and the reply came "I had to wean it, it was not doing well, and I am so poorly myself": I am not surprised that so many nursing bottles are used, and that so many babies die.

Think of a woman, with teeth badly broken down, with gums inflamed, with pus exuding from about old roots, with fistulas opening on the gums; pouring pus into every mouthfull of food on its way to the stomach. Is it any wonder that such mothers are not strong enough to nurse their children, or that babies are poisoned by feeding at the breast of such mothers?

But I have said enough of the conditions. What can be done to remedy the existing conditions? The dentists of this country know the conditions, as no other class in the community knows them. Does the knowledge entail responsibility? I believe it does. Do not, however, misunderstand me. I do not mean that the dentists of Ontario could or should remedy the existing conditions, by giving their services free to a suffering public. This, of course, is manifestly impossible. But it is true today, as it was three thousand years ago—"The people are destroyed forlack of knowledge." "The best that a dentist can hope to do, is to point out the conditions and their awful consequences. It would take almost all the dentists of Ontario properly to care for the teeth of the children of Toronto alone.

There is a campaign for hygienic mouth conditions, for the children of Chicago, being carried on at the present time, and those who are interested and know the conditions say that it would take all the dentists of Michigan, Indiana and Illinois to care for the mouths of the children of Chicago.

But the dentists must assume the responsibility of educating the people along the lines of mouth hygiene. Something is now being done in some of our public schools. This public school work should be multiplied a hundred fold. Every teacher in training, from kindergarten teachers to university professors, should receive from competent dentists instructions along these lines, so that children young and old might be taught to guard against the evils that follow in the wake of diseased mouths and teeth. Something is now being done by the Y. M. C. A.'s along the line of "shop work," where, in the large factories, health talks are being given to the workers. It perhaps will not be thought strange that these working men are more deeply interested in the talks on the teeth and mouth than in any other form of health talk. The reason is not hard to find. They know from experience the suffering and loss due to diseased mouth conditions.

Our Y. W. C. A.'s offer equally good opportunities for a campaign of education. But how is the work to be done? The dentists of this country are very busy men, and most of them are far from being wealthy. Only the most self-sacrificing will give time and energy to a campaign of this kind, "for love's sweet sake," and thus far "the

luxury of doing good'' has been their only reward.

Let me draw your attention to two facts that to me are most astounding.

If you will read the reports of the medical and dental inspection of the public schools, you will see that diseases of the mouth and teeth far outnumber all other diseases combined.

And yet the medical schools of this country send out their students without any teaching concerning this most prevalent of all diseases.

Another peculiar fact.

The splendid work of the Health Department of the Ontario Government is worthy of all commendation.

Recently the province has been divided into a number of districts, and a medical man assigned to each. Not a single dentist assigned, although dentists alone have a working knowledge of the disease most prevalent in every community in the province. It seems strange—does it not?

A few years ago ''hog cholera'' was epidemic in some counties in Ontario. Veterinary surgeons were kept by the Government in these counties, to stamp out the disease, and to prevent it spreading.

The whole nation suffers from diseased mouth conditions. The Government so far has taken no notice. As Dr. C. N. Johnson says, ''There is some advantage in being born a hog.''

Does the Government know that a certain form of tumor, once very prevalent among the people of the Southern States, is disappearing since the people began to take proper care of their teeth?

Does the Government know that a large percentage of all cancers occur in the mouth, tongue, throat, stomach and other portions of the intestinal tract? Is there no connection between this fact and the inflammatory conditions that always accompany diseased teeth?

Yes, the dentist must do the work of education, but not as a philanthropist. The nation's well-being is at stake, and the Government of the nation should undertake this educational campaign, for the benefit of the general public.

In almost every civilized country in the world there is at the present time a vigorous campaign being carried on for hygienic mouth conditions. If we look only on the surface this is a hopeful sign. But the campaign has been started almost entirely by dentists who saw the conditions, and realized the consequences of these conditions.

In their enthusiasm they started a campaign of instruction. In a few places the dentists volunteered to give their services without remuneration to treat those who needed the services of a dentist. But the work overwhelmed them, and it was abandoned in almost every centre in which it was attempted.

In a few places (notably in Boston) millionaires have established and endowed dental clinics, where the teeth of the poor for all time, may be looked after, free of charge.

But what is to be the result of this campaign of education. Certainly a knowledge of the conditions, and the evils consequent upon the conditions, is not the end sought after. The conditions should be improved and the consequent evils averted.

But how can this be done? Two things stand in the way of this devoutly to be wished for consummation. One is that there are not enough dentists to do the work that is now presented, and the other is that if there were dentists enough, the unskilled wage earner to-day can not pay for medical or dental attention.

Every dental college on the continent is being besieged for graduates. Cities, towns and villages are writing us for young dentists and offering good openings. The colleges cannot or are not supplying the demand.

But the second obstacle: the unskilled laborer to-day cannot pay for dental service. How can he? I have given some thought to sociological questions, and I believe I know whereof I speak.

Let me state the position. Take as an average wage earner, the man who makes twenty-two cents an hour, married and has three children. He works ten hours a day, and six days a week. Thirteen dollars and twenty cents a week. He can not get a house to live in for less than sixteen dollars a month, so that four dollars a week must go for rent. What they eat will cost them at least five dollars a week. So that there is left four dollars and twenty cents to pay for coal, gas, water, clothing, car fare, perhaps a little insurance in some fraternal organization, and the thousand and one ''etceteras'' that occur in every home. Tell

me how under the heavens are such men to obtain either dental or medical attention for themselves or their families.

The case I have stated is above rather than below the average.

A laboring man said to me a short time ago, speaking of present social conditions: "I have attended four funerals in the last three weeks of men who died, from the shop in which I work. There is no doubt in my mind that these men died because of the conditions under which they had to work, and under which they had to live at home. The most that a laboring man can make in our shop is fifteen and a half cents an hour." $9.30 a week. Think of telling such people that they should have their teeth fixed.

God bless the millionaires who, like the three Forsyth brothers, of Boston, give some of their millions to establish and endow free dental clinics. May the good Lord greatly multiply the number of such.

And yet I can see a vision of a vastly better condition.

If millionaire employers would give to the wage earner a fair share of the wealth which the wage earner does so much to produce, then such laborers might secure dental service, not as a charity or a gratuity, but as a service, paid for as men desire and delight to pay for that which they receive. The pauperizing process which always accompanies the giving of charity would be materially lessened. There would be some earnest of that "more abundant life" which the Man of Galilee said He came to give, and of that brotherhood He came to establish.

There is, however, this comforting thought of the campaign for hygienic mouth conditions, and the dental inspection of school children:

The children in the public schools are learning that clean teeth are not likely to decay, and that clean mouths make for strong bodies. This in itself is a great boon. And I believe that some solution of the problem will be found, when the people are fully seized of the importance of good teeth and clean mouths, when school boards realize the financial loss occasioned because children whose mouth conditions are bad require extra time in the public schools, when Governments learn that the national wealth is lessened because "maximum efficiency" is impossible from men whose mouth conditions are not what they should be, when Britain learns that the condition of her people's teeth is more to be feared than the German peril, then and not till then will the lamentable mouth conditions, now so nearly universal, give place to a better order of things, and "tolerable human existence" will more nearly be realized.

THE VITALITY OF TYPHOID BACILLI IN WATER*

JOSEPH RACE, F.I.C.

The transmission of typhoid and other enteric diseases by means of water is dependent on the fact that the specific organisms of these diseases can maintain a saprophytic existence in this medium. Water is, however, not suitable for its reproduction, so that the existence is merely a temporary one, the period depending upon various factors, the most important of which are, Temperature, organic content, total bacterial content, dissolved oxygen and sunlight. Frankland (1895) and Klein (1894-1895), working independently, both came to the conclusion that the normal bacterial flora of water was inimical to typhoid baccilli, and also that an increase of temperature reduced the vitality of the typhoid organisms. Clark & Gage (1902) have published the results of experiments demonstrating the germicidal influence of sunlight on typhoid bacilli. As a practical agent in the purification of streams, even when these are very shallow, the influence of light is, however, probably not of material importance.

Jordan, Russell & Zeit (1904) from their experiments with the water of the Chicago drainage canal and Illinois river, concluded that the longevity of the typhoid baccillus was greater in pure waters than in polluted ones, the unfavorable factors in polluted water being the geater organic content, and larger numbers of antagonistic saprophytic organisms. These conclusions were confirmed by Russel & Fuller (1906); Whipple & Meyer (1906) demonstrated that the pressure of dissolved oxygen in water caused typhoid

*Read before the Canadian Public Health Association Congress, Toronto, 1912.

bacilli to maintain their vitality for larger periods of time than when no oxygen is present, and they suggest that this phenomenon partially explained the results of Jordan and his confreres, as an increased organic and bacterial content would undoubtedly reduce the amount of dissolved oxygen present.

Frost (1904) showed that certain soil bacilli, such as Proteus Vulgaris and B. Fluorescens liquifaciens, were decidedly antagonistic to typhoid bacilli and assisted in their destruction.

The most important work in recent years in connection with this subject is that of Dr. A. C. Houston, Water Examiner to the Metropolitan Water Board of London. In his various reports, he shows the longevity of typhoid bacilli at different temperatures from 0 degrees C. to 37 degrees C. These results show a reduction of over 99 per cent. of typhoid bacilli in 7 days at 10 degrees C. as against 50 per cent. at 0 degrees C. Temperatures over 10 degrees C. are even more destructive, a count of 103,000 bacilli per ccm. being reduced in 7 days at 37 degrees C. to 5 per ccm. All these results, and those of previous experimenters, were obtained with cultivated organisms, i.e., bacilli that have been grown on artificial media. Up to within the last few years the consensus of opinion has been that cultivated or "naked" organisms would disappear more rapidly than their uncultivated brethren, and that experiments with cultivated bacilli could not be used as a criterion of the vitality of uncultivated bacilli. In view of the lack of data on this point, this was undoubtedly the safe attitude to take, but the researches of Dr. A. C. Houston have proved beyond doubt that such uncultivated bacilli as are discharged by typhoid carriers disappear much more rapidly in water than the same strain after cultivation on artificial media. The results of numerous experiments showed that the uncultivated bacilli diminished in number 5-10 times as rapidly as the cultivated bacilli in both bottle tests made in the laboratory, and in outdoor tests in tanks holding 350 gallons. The laboratory bacteriological tests as to the presence of typhoid bacilli were confirmed by drinking tests, so that the question of a resistant minority was eliminated. These tests were carried out by one observer (A. C. H.) drinking a half pint of the water on the 24th, 25th, 26th, 27th, and 28th day after infection. This quantity originally contained over 218 million typhoid bacilli and was tagen at different times of the day. No evil results were observed.

In the present state of sanitation, the ejecta of typhoid patients is usually sterilized by means of germicides before being discharged into the sewage system, so that the greater proportion of typhoid bacilli discharged into the drains are derived from the ejecta of typhoid carriers and are the ultimate causes of epidemics of typhoid due to sewage pollution of the water supply. Houston's experiments are, therefore, of pre-eminent value, and our views on this important subject must undergo a radical change. Water-borne typhoid must be due to *recent* pollution except in very cold weather, when the temperature of the supply approaches the freezing point of water. This accounts for the seasonal prevalence of water-borne typhoid in cities taking water from the Great Lakes System, occurring in the spring months, when the streams feeding the lakes are in a condition of flood, and the temperature is very low. The flooding of the streams increases the pollution, and the period elapsing before use is insufficient to destroy the pathogenic organisms. In the case of Lake Ontario, the average monthly temperature as indicated by the readings for the Toronto water supply are as follows. This water is obtained 2,700 feet south of Toronto Island at a depth of approximately 50 feet.

TABLE OF TEMPERATURES.

	1907	1908	1909	1910	1911	1912
Jan. . .	35.3	36.5	36.0	34.5		34.5
Feb. . .	35.1	34.4	35.0	34.2		33.0
Mar. . .	34.8	34.0	34.5	37.2		33.7
April .	35.8	35.9	37.5	42.3	38.3	35.5
May . .	39.1	40.7	40.6	44.2	43.0	39.7
June . .	41.8	41.7	44.4	47.6	49.6	42.6
July . .	41.9	44.8	43.5	49.2	48.5	
Aug. . .	46.5	48.6	57.8	56.6	56.9	
Sept. .	49.7	53.6	54.1	61.6	60.6	
Oct. . .	42.3	48.0	43.2	52.9	52.5	
Nov. . .	41.2	41.1	42.3	41.8	42.3	
Dec. . .	37.7	38.2	36.8	35.3	39.6	

It will be seen that for the greater portion of the year the temperature of the water is so low that typhoid bacilli might survive in it for a considerable length of time, and it is, therefore, desirable that the number

of pathogenic organisms entering the lake in the neighborhood of water intakes should be reduced to a minimum. These organisms could probably be totally eliminated by the use of enormous storage reservoirs, but as this is almost an impossibility in this country owing to climatic conditions making the cost of construction prohibitive, emphasis must be laid upon the importance of guarding water intakes from recent pollution, or else providing such methods of purification as will absolutely safeguard the consumers. In a selection of these alternatives, economic questions must be given full consideration, and it must be remembered that whilst the latter method can be adopted at any time by any individual or community, the success of the former, which is the ideal from a sanitary standpoint, is dependent on the co-operation of individuals and communities.

In Ontario, recent legislation, by placing the question of sewage pollution under the authority of the Provincial Board of Health, will undoubtedly do much in this direction, but the ideal will not be reached until the co-operation becomes inter-provincial and international. This is the ultimate aim of all sanitarians, but until this is reached our water supply must be rigorously inspected, and, if found to be subject to contamination, thoroughly purified.

STORM AND SURFACE WATER DRAINAGE IN RELATION TO SEWAGE DISPOSAL*

BY R. R. KNIGHT, C.E.

What is known as storm or surface water is that portion of rainfall falling upon a drainage area which finds its way into the sewers.

This liquid, which carries with it all sorts of organic and inorganic matters washed down from the street and land surfaces, and roof areas, and flushed out of the sewers, forms a diluted sewage which doubtless is of a very dangerous polluting nature when regarded in connection with its discharge into streams, rivers or lakes forming a source for water supply.

To deal with this question it is proposed to consider it under the following heads:

(1) Rainfall.
(2) Characteristics of drainage areas.
(3) Quantities of storm water.
(4) Characteristics of storm water.
(5) System of seweage (whether combined or separate).
(6) Purification.

(1) Rainfall.

Both the quantity and rate of precipitation of water by storms have direct bearing upon the question of storm water drainage.

It is necessary, in order to arrive at some basis of calculation, to carefully study the records of rainfall for previous years. Extraordinary storms, viz., those above one inch per hour precipitation, should be tabulated with the amount of fall in inches, the duration of the storm and the rate of fall.

A combination of these figures will enable some estimate to be made of the probable discharge of storm water.

It is not safe, in the light of providing for the purification of the storm water discharged, to take an average, and strictly speaking only the excessive storms should be considered. The arguments in support of this statement will be found later.

The records of rainfall in Toronto show, for instance, a precipitation of 0.40 inches in 5 minutes, or a rate of 4.8 inches per hour, for a storm in August, 1904. This storm is perhaps the maximum which might be expected in Toronto.

During the period 1903 to 1911 the records show that Toronto had three storms giving a precipitation of over 4 inches per hour, four storms precipitating 3 to 4 inches per hour, eleven storms 2 inches to 3 inches per hour, and twelve storms 1 inch to 2 inches per hour.

In considering the question of rainfall with respect to the amount of storm water, it would appear that attention should only be paid to the probable storms of maximum intensity. In a later chapter of this paper this will be discussed.

Having collected all data with respect to the rainfall, the next consideration is that of the surfaces upon which the rain will fall and their respective permeability or impermeability.

(2) Characteristics of Drainage Areas.

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The earth's surface, before human habitation, is amply provided with the necessary creeks, streams, rivers, and lakes for the removal of all surface water that is not absorbed by the earth or evaporated.

As a district becomes populated the earth's surface is materially changed. Houses with impervious roof surfaces are erected, streets are laid out and paved with non-absorbent material, forest lands are levelled, the natural water courses are filled in and put into disuse.

Instead of going into the amount of run off from natural land surfaces, as is the case for water supply and irrigation, the engineer has to estimate the probable character of the surface developed as a town. The question of geological formation, the permeability and power of absorption of the top soil, the slope of the ground are under these circumstances more or less irrelevant.

For the purpose of storm water calculations for a sewerage scheme it is necessary to form some idea of the amount of area covered by imperious surfaces. Actual measurements should be taken and the proportions of covered surfaces found.

In connection with the storm overflow scheme for the City of Toronto, I had dimensions taken of different types of properties in order to arrive at some basis for design. The proportions given in the following table are for streets, sidewalks and house roofs only. It was considered that the amount of rainfall that would run off boulevards and gardens would be balanced by the amount absorbed by the so-called impervious roof and street surfaces, and that retained by depressions and evaporated. This would seem to be a rough method after taking careful measurements. In view, however, of the difficulty to ascertain the amount of run off from boulevards and gardens which would vary considerably with the state of saturation of the ground previous to a storm, the character of the top soil and the slope of the surfaces, it was found prudent to take a liberal margin above the proportions ascertained by measurement.

The information obtained by these surveys is as follows:

Impervious Areas. Re Storm Overflow Sewers.

Toronto.

Population per acre.	Impervious area.	Remarks.
19	0.19	Open good property.
24	0.43	Stores and old dwellings.
25	0.21	Good class new property.
30	0.19	Good class new property.
30	0.37	Good class new property (large garden).
36	0.37	Good class new property.
37	0.36	Good class new property.
42	0.26	Good class new property (large garden).
50	0.35	Ordinary terrace houses.
55	0.37	New semi-detached property.
60	0.33	New semi-detached property.
65	0.43	Old terrace houses.

The population is estimated at 5 persons per house or store.

The down town store and office areas were not surveyed owing to the difficulty of typifying any particular area. For these areas 0.5 and 0.75 were taken according to density.

With an intimate knowledge of the drainage area it is a simple matter to divide the district into areas according to the class of property covering them.

So far consideration has been had of the probable rainstorms and the proportion of the drainage area that would receive and discharge such storms into the sewerage system.

Having this information, the next thing is an estimate of the quantity of storm water.

(3) Quantity of Storm Water.

The whole question of the amount of storm water is one of difficult solution. It really has no absolute solution, and an approximation only can be arrived at. If rainstorms would come at regular intervals, continue for certain equal periods, and

precipitate at equal rates, then the engineer would have an easy task and an easy conscience. This ideal is not We have heavy rainstorms of short and long duration and slight showers of a few minutes, and those lasting for hours. It is not, of course, odd to find each of these classes of storms, excepting slight short showers, giving an equal total quantity of rain, let it be assumed for the purpose of argument that three storms as outlined above are under consideration.

The first storm—heavy storm, short duration. This is the most troublesome of all. Take the storm mentioned before which occured in Toronto in 1904, viz.: 0.40 inch. in 5 minutes, or 4.8 inch. per hour. This gives a rainfall of 4.8 cubic feet per second for every acre. In a city of the size of Toronto, say 18,000 acres, such a storm would give a rate of discharge of 86,400 c.f.s., when the whole area is built on. This total is, of course, small, owing to the proportion of impervious areas being taken at one-third only. Approximately 100,000 cubic feet per second would be discharged by the sewers when the whole area is built on. In five minutes a total of 30,000,000 cubic feet would be discharged. In the case of a heavy storm of long duration the average rate of fall is probably much smaller. A storm recorded in Toronto in July, 1903, precipitated 0.47 inch during 25 minutes; this gives a rate of 1.13 inch per hour. The rate of rainfall from such a storm would be 1.13 cubic feet per second per acre. The slight shower of a few minutes duration does not affect the question.

A slight rainfall lasting perhaps 8 hours with a precipitancy rate of 0.06 inch per hour would give a total rain of 0.48 inch, but the rate of rainfall discharge would be 0.06 cubic feet per second per acre.

The total quantities of rainfall in the three cases are practically equal, viz., 0.48 inch, 0.47 inch, and 0.48 inch, but the rates of discharge of rainfall are variable. In the first case, 4.8, the second 1.13, and the third 0.06 cubic feet per second. As will be shown in the next sub-division of this paper the rate of discharge has a great deal to do with the conclusions as to purification. In these three instances are shown rates for storms of the following classification: (1) Very extraordinary, (2) Extraordinary, and, (3) Ordinary.

To find the quantity of rain discharged into the sewers the proportion of impervious area has to be multiplied by the rate of fall.

(4) Characteristics of Storm or Surface Water.

No analytical data pertaining to this liquid are available from American sources.

The report of the Royal Commission, however, gives analyses of seven samples. There it states that:

"Three out of the seven were non-putrescible, the other four undoubtedly polluting liquids. Bacteriologically all the samples may be classed as bad.

Although specific particulars are absent, there should be no hesitancy on the part of the engineer to consider the storm water as having a decided polluting nature, especially in the case of the combined system of sewerage.

The findings of the Royal Commission are quoted here:

"The witnesses have agreed that the first flush of water from a surface water system during a storm is of such a foul nature that it ought to be purified if practicable, especially if the system brings water from paved streets, etc.

"Experience also shows that with two sets of drains to each house there is danger of the sewage drain being connected with the surface water sewer, and in densely populated areas, slops and other filthy liquids are often emptied into street gullies and pass directly into the surface water sewer.

"There can be no doubt, therefore, that the liquid brought down by surface water sewers is frequently of a polluting nature and that in many cases it might be necessary to provide for its treatment."

In this conclusion, which is worded, it would seem as to avoid any direct conviction on the part of the Commissioners, every engineer is agreed.

The first paragraph, however, points directly to the vital question, viz., the "first flush."

As far as the street and roof surfaces are concerned, the first flush occupies only a few minutes, three at most; but the selection of the first flush in the sewers themselves is difficult, owing to the varying distances and periods of travel to the outfall. The storm will be over long before the first flush from outlying districts reaches the

disposal works. The first flush in a heavy storm carries with it the greater proportion of the filth on the streets and roofs, and, what is of greater importance, the sediment in the sewers themselves. Could this first flush be selected and turned into the sedimentation tanks and filters, and treated as sewage, the remainder of the storm water could be discharged without grievous risks into the rivers, etc.

It is impossible, however, to select, unless the drainage areas are made very small and treatment applied to the discharges from each one. This is, of course, impracticable, and it behoves the engineer to look at the problem squarely and provide for a quantity of surface water which he considers would be classified as "polluting liquid."

The question of the design of the sewerage system, whether combined or separate, comes very much into the limelight here with regard to the characteristics of storm water discharged.

(5) System of Sewerage (Whether Combined or Separate).

The combined system is that in which the whole of the liquid wastes from domestic and trade sources, together with subsoil and surface water drainage, is conveyed in one set of pipes or conduits. The seperate system has two sets of pipes and conduits, the one for domestic and trade sewage, the other for subsoil and surface waters.

It is only in the case of new towns that the engineer has an opportunity to decide this question. The older towns have either one or the other already in use, and, in many instances, a separate system has been originally intended, but has been called upon as streets were paved to take the surface water. Absence of supervision has also been responsible for the loading of such a system with the roof water from houses. The natural outcome of this is floodings.

The choice between the two systems depends upon several features. Other than that which affects the purification of the resultant liquids would be out of place here.

In order, however, to make the paper as complete as is practicable within limits, an extract from the report of the Royal Commission dealing with this matter is included, as follows:

"In our opinion, the cases in which the provision of a separate system can properly be justified are rare, and it appears to us that the relative merits of the separate and combined system have not always been sufficiently considered.

"It is obvious that the provision of two systems of sewers and two sets of house drains would very largely increase the initial outlay on drainage works. It seems, generally, to have been assumed by advocates of the separate system, that the liquids brought down by surface water sewers is sufficiently pure and needs no purification, and, further, by excluding this water from the ordinary sewers a much smaller area of land or filters will suffice for the purification of the sewage.

"Experiments, however, on diluted and undiluted septic tank liquors showed that within the ordinary limits of concentration and volumes, the amount and nature of the organic impurity present mainly determine in practice the ease or difficulty of purification; in other words, that within limits mere dilution does not affect the size of the filtering plant which is necessary, of course, if the dilution is so great as to cause water logging of the filters, their purifying powers would be seriously diminished and this statement would not hold good.

"We may also observe that the flushing of sewers by rain water, which occurs with the combined system, is in itself useful, and that there is some evidence to show that filters work better when storm sewage from which the solids have been settled is occasionally passed through them.

"We concur in the following views: In large towns the separate system is impracticable. In urban districts a combined system is justified on sanitary and economical grounds, and that only in villages, country districts, and suburban areas where there is little traffic and where the surface water will not be very foul, may the separate system be adopted with advantage."

From the point of view of the Canadian engineer, these conclusions are of little value. The question of initial outlay is a vexed one, but should not be entered as an argument. Results from a sanitary standpoint are the only ones to be considered. The engineer of to-day does not say that surface water drainage is sufficiently pure to need no purification. He does, however, say that with proper supervision

of connections to a separate system the sanitary flow and storm water are kept apart to the extent that one form or degree of treatment can be applied to the one, and another to the other. In Canada, our storms are so much more intense than in England, and water logging of filters, of which the extract speaks, would be likely to take place frequently were the combined system in operation. It is admitted that the flushing by rainwater of combined sewers is beneficial, and, in fact, necessary, owing to the slow velocities obtained, due to the size of the sewers. It would have been but fair, however, to mention that the sewage sewers in a separate system are designed to give self-cleansing velocities, and, where these cannot be obtained, flushing tanks are operated.

With the final statement Canadian engineers will take issue. Had our larger cities been sewered on the seperate system they would not at the present time be troubled with the construction of storm overflow weirs and penstock chambers with their variable discharges.

The first sewerage scheme of a town with any chance of growing should be on the separate system, profiting by the experiences of Toronto, Montreal, Ottawa, London, Hamilton, Regina. These cities are at the present time very much hampered in connection with the question of sewage purification, simply because of the installation of the combined system.

The City of Regina is spending huge sums of money in converting a combined system into a separate.

How the matter of combined or separate system affects the question of purification is simply this. In the case of the combined system the liquid to be dealt with is sewage during dry weather, and diluted sewage during storms. In the case of the separate system, the liquids are separate and the one is composed of sewage, the other of storm water sewage. It will easily be seen that the combined sewage and storm water varying as it does in dilution according to the amount of rainfall, is more difficult to treat and requires more careful handling than the seperate sewage and storm water.

In the combined system regular sewage sedimentation tanks and filters have to be provided for at least three times the normal dry weather flow. In the separate system one and a half times need only be provided for.

The final stage of these considerations is that of purification of storm water.

(6) Purification.

It has been pointed out before that there should be no doubt but that storm water should be treated before it is discharged into a source of drinking water supply.

As to how much or how little purification should be carried out it is difficult to say in the absence of information on the subject.

The finding of the Royal Commission are as follows:

"In our experience the first flush of storm water contains a very large quantity of suspended matter washed out of the sewers and is organically very impure. This flush, moreover, usually occurs at the time when the rainfall flowing off the area causes the maximum flow in the sewer, the consequence being that an ordinary storm overflow on the sewers often has the effect of diverting to a water course the worst part of the storm water, while allowing the less foul storm sewage which arrives later to pass to the tanks or filters.

"In our opinion, the difficulties in dealing with the increase in the flow due to storms, can best be met by the provision of stand-by tanks to receive the storm sewage in excess of that which can be passed through the ordinary tanks. The main overflow at the works should be from the stand-by tanks and not from the outfall sewer. So that no sewage can escape without some settlement, such overflow not to be operable until the stand-by tanks are full.

"We have not sufficient experience to enable us to suggest by what rules the capacity of the stand-by tanks should be determined, but we should think that tanks capable of holding six hours dry weather flow would usually be sufficient. Local circumstances would, however, have to be considered in settling the capacity required for any particular place."

Some form of stand-by tank is the solution of this problem. This is, indeed, a step in this important problem, and the sooner the towns and cities guilty of lake and river pollution realize that their storm waters have to be treated as well as their sewage the sooner shall we reach

that standard of purity which will meet both the scientific and aesthetic needs.

For the capacity of these stand-by tanks the Commissioners suggest a six hours' dry weather flow capacity. Why it is considered in terms of dry weather flow and not rainfall is peculiar. The dry weather flow has no relation to storm water, and the rainfall should be the dominant feature in a calculation for stand-by tanks for storm water.

As to the length of retention of the storm water in the stand-by tanks nothing definite to meet all circumstances can be given. From one to two hours, at least, should however, be provided for, according to the character of the storm water.

In order to arrive at the necessary capacity for these stand-by tanks, the amount of rainfall brought down by the probable maximum storm during the first three minutes should be provided for. The length of time which would be occupied by the storm water in reaching the outfall works should be taken into consideration so that the stand-by tanks can be constructed of a minimum capacity in order to reduce the cost.

To provide one stand-by tank for the whole of a city would not be practicable. In most cases the storm outlets are numerous and a certain number of these should be collected by a trunk storm sewer. Several stand-by tanks can be located to suit these, and as soon as the period of settlement is over the resulting liquid can be drained or pumped off.

The precipitated sludge would have to be removed by other means than by drains or pumps, as it is probable that a great amount of heavy detritus would be present.

An overflow from the stand-by tanks should be provided, and all storm water should be passed through this tank. Direct currents should be avoided, as is the case in sewage sedimentation tanks. It would seem advisable to fill the tanks over a long weir at one side and overflow them by a similar weir at the other. A square tank would seem to meet the case. The proposition differs materially from that of sedimentation tanks for sewage, where the flow is fairly regular and the quantity comparatively small.

In the case of storm water we have a huge quantity of liquid to deal with in a short space of time. With this in view it will be necessary to arrive at some new form of settling tank suited to the purpose.

In addition to the precipitation of sludge there is need for the retention of floating matters. In most cases this cannot be accomplished by screening, as is the case with sewage. Probably the best means to this end would be a grating or screen on the outside of the tanks below the overflow weir.

The liquid remaining in the stand-by tank should be run through roughing filters at a slow rate.

Up to the present time storm water filters alone have been employed without previously settling the storm water. The extract from the report of the Royal Commission in reference to the provision of these filters is as follows:

"Speaking generally, we are not in favor of special storm water filters, for although if well constructed and scientifically managed they can be made to give good results, our experience has led us to the conclusion that they do not effect a purification in proportion to their cost.

"If storm water filters are not regularly used their oxidizing efficiency may in time of dry weather become impaired. If, therefore, they are to be used in dry weather in order that they may be kept mature, it appears to us that they should be as well and as carefully constructed as the ordinary filters. It seems also false economy to have some part of the filtering area out of use for any length of time when the additional area if used would be of advantage in giving regular periods of rest to sections of the normal filtering areas.

"We think it may be taken that it is practicable to filter three times the mean dry weather flow, we doubt whether as a general rule the filtration of any larger amount will be found necessary to prevent nuisance."

The Commissioners suggest that the storm filters may in time of dry weather become impaired as to oxidization efficiency. It will, of course, be necessary to go into this matter experimentally and meet this requirement. It is, however, probable that in most instances filters would not be located where sewage could be turned on to them to keep them mature.

The last paragraph is not definite at all. In Canada, however, it will be necessary

to treat the storm or surface water up to a much higher proportion than three times the dry weather flow.

It must be understood, however, that the Royal Commissioners' report deals with stream and river pollution, not so much with regard to sources of water, but in view of prevention of sludge deposits and evil smelling nuisances.

In most cases in Canada the question of water supply is a dominant feature and a very much higher standard of purity is aimed at. With this in view it is essential that the matter of storm water discharge into our lakes and rivers shall receive as complete attention as has been given to other matters affecting the purity of our water supplies.

The solution of such a problem will be costly. Regina, however, has made a start, and, with a view to preventing the pollution of the Wascana River, is converting a combined system into a separate one. Stand-by tanks of capacity equal to the first ten minutes' flow above three times the dry weather are in operation the liquid being pumped, after settlement on to the sewage filters.

In Toronto, the question of storm water sewerage has been and is acute. Nothing, however, beyond screening at overflow weirs has been done with regard to the purification of the storm water. Toronto is drained on the combined system, the older portion of the sewers have from time to time been extended until overloaded and floodings have occurred. A system of storm overflow sewers is in course of construction with a view to relieving the flooded sewers. Overflow weirs have been constructed, set at five times the dry weather flow as a means of separating the storm water from the sewage. The whole of the storm water from Toronto is discharged into the bay and lake. One storm overflow sewer alone being designed for nearly twelve hundred cubic feet per second capacity.

What Toronto is doing is being done in all lakeside cities, and many inland towns and cities are polluting the rivers with storm water. The time has come when a decided stand should be taken and this pollution prevented by means of settlement in stand-by tanks and screening in roughing filters.

THE SANITATION OF THE BIVOUAC

BY LIEUT.-COL. D. B. BENTLEY, A.M.C.,
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The health of the troops is the most important factor in preserving the efficiency of an army. As soon as a soldier becomes ill or is injured he loses his value as a fighting unit and becomes a charge on the time of others who must take care of him. Not only himself, but his arms and accoutrements must be looked after until he recovers and can use them again or until he is transferred back to the base hospital or invalided home. All the energy thus called into use to care for the sick is just that much taken away from the fighting capacity of the troops.

The responsibility for the maintenance of the health of the troops largely falls on the medical branch of the service, and I might point out some of the difficulties to be met with by that branch in carrying out its full duty. The medical officer is often confronted with the fact that his advice is not taken, by the commanding officer, it may be owing to the lack of appreciation of the necessity to do so, or it may be found that the exigencies of war make it impossible to carry out his instructions or desires. Ignorance or carelessness of the officers and men in regard to sanitary rules and personal hygiene is often responsible for outbreaks of sickness and particularly in the case of troops recently enlisted, the reason for this condition is easily explained.

A man in civil life is, to a great extent, master of his own time. He can choose for himself what he wishes to eat, what clothing he wears and what occupation he wishes to follow. In towns and cities the municipality take care of the waste products of the home, the street, etc., water for drinking, bathing and general use is supplied, and when he is through with it, the corporation sewers carry the waste away. In the country, waste is taken care of by nature's sunshine and abundance of fresh air. Now it is quite clear that the man in ordinary life is protected and taken care

*Read before the Second Annual Congress, Canadian Public Health Association, Toronto, 1912.

of so far as sanitation is concerned without any special effort on his part.

When this man becomes a soldier he loses his independence of action to a great extent; he is housed, clothed, fed, and exercised by order, and it becomes the duty of the State to see that he is properly instructed in all matters of sanitation and personal hygiene so that he will not only take good care of himself but will not be a nuisance to his comrades in arms.

Unless these last mentioned precautions are taken before men are taken into camp and strict discipline enforced, it will be impossible to have sanitary hygienic camps, barracks or bivouacs.

The selection of the site for a bivouac is often determined by immediate and strategical consideration. When practicable, the site should be selected by a competent medical officer, trained in camp sanitation. It should be placed on high, well drained ground. In summer it should be protected from the burning sun, and in winter from cold winds. The soil should be dry and porous. Cold clay being the most objectionable.

A convenient water supply is necessary for drinking purposes, for cooking, and for bathing, if possible. This water supply should be protected by a guard and every precaution taken to safeguard the water supply from pollution by men and horses.

To insure safe drinking water, it is often necessary to either boil or treat chemically, with hypochlorite of lime. On reaching the site of bivouac, before the men are dismissed, details should be set to work building camp kitchens, latrines, incinerators, etc., for the proper care of all waste and excreta, and each company officer should see that his men are instructed as to the necessity of using every care to avoid fouling the grounds.

The purification of water for drinking and cooking purposes should be placed in the hands of a competent non-commissioned officer properly instructed as to detail.

Latrines should be screened and care taken to have all excreta covered with earth, ashes or lime, as soon as deposited. Fire is a good protection from possible fly development. All kitchens should be guarded, food covered and thus protected from flies.

Before leaving the camp should be rendered as free from refuse and waste as possible, by burning the same. The sinks and latrines should be filled in and the sites of them marked. The ground should be scorched by fire, particularly where any waste products have been treated. By following out such a careful treatment of the camp site it is possible to keep it in a good sanitary condition during occupation, and the possibility of it being dangerous to troops who may have to camp there later on are minimized.

MUNICIPAL MEAT INSPECTION

BY ANDREW R. B. RICHMOND,
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My first duty as a comparatively recent and junior member of the veterinary profession is to thank this Association for the opportunity to read the following paper on this, one of the most important questions confronting the public health authorities and general public throughout this country.

Meat inspection and meat hygiene may be defined as that branch of veterinary science which has for its direct object the preservation of the health of the public, the prevention of disease from the consumption of meat which is unfit for food being its chief aim. The subject is a vastly wide one and, in a paper of this kind, it is only possible to touch upon the different phases of it.

The origin of the meat industry is somewhat obscure. We are indebted to archaeologists for a great deal of information, which they have gleaned from a study of the remains of the past.

To quote from authorities, man has passed through four different stages in the existence of the world.

First, the savage state, when the struggle for existence was merely a contest with the lower animals for food.

The second state was that of Nomadic existence, and the development of ownership of flocks and herds.

*Read before the Second Annual Congress, Canadian Public Health Association, Toronto, 1912.

The third state was that of the early agriculturalist, who tilled the soil and multiplied its resources.

The fourth state is the greatest of all and is associated with the development of industry.

In all these phases the motive which predominates is the desire for food, although it may appear in very different guises in the various stages.

There is no doubt, however, that man at all times, at least as far as our knowledge extends regarding his early form of life upon the earth, consumed meat food.

Coming down through the ages we find different nations and individuals laying down and adopting various laws regarding the slaughtering of and fitness and unfitness of certain animals for human consumption. The Athenians and some other nations prohibited the slaughter of the working ox, either for sacrifice of food.

The Buddhists considered it a sinful think to kill any animal for food.

The Hebrews were given permission by Moses to make use of whatever vegetable products they desired, also certain animals "whatever divideth the hoof and cheweth the cud."

Other animals were resignated unclean, and their use for food strictly forbidden.

The reasons for these classifications are obscure, but are usually associated with certain religious rites or some empirical motive.

To-day, wherever a proper system of meat inspection is in operation (and I am sorry to say that in this country, as in others, these systems are few and far between), the judgment whether certain meat is fit or unfit for food is arrived at, as Dr. Melvin has so aptly put it, "Upon the general principles of pathology in its relation to the public health, and not upon any preconceived, exaggerated, or sentimental ideas."

Meat, which was the principal article of food in the Middle Ages, attracted the Civil Authorities of Germany, and in the year 1120 A.D. records show that meat traffic received consideration.

In decrees issued in Germany in the 13th and 14th Centuries in connection with meat traffic, we find mentioned Pearly Disease, Measles of the Hog, Bloating of Meat, Immaturity of Calves, etc.

In 1276 A.D. compulsory slaughter, with compulsory inspection and declaration of sick animals, was ordered for the public abattoir in Augsburg.

Yet, notwithstanding the fact that as far back as the fourteenth century public abattoirs existed and inspection was in force, we, of the twentieth century, with all our scientific knowledge of the subject, are practically only awakening to its significance.

It has been proved beyond the shadow of a doubt, that there are certain bacterial diseases, and diseases due to animal parasites, transmissable to man, either from coming in contact with the living animal or from the consumption of the meat or meat products of the animal affected.

With the exception of a few dietetic faddists everyone is dependent upon the meat industry to a greater or less extent for their daily food. There are but very few people who have no interest in this subject, when it is considered that those taking part in the production of food animals, and the supply of meat and its products include the breeder, farmer or rancher, transportation companies, drovers, salesmen, slaughterer, veterinary inspector, medical officer of health, butcher, cook and the consumer. The apathy with which this subject is treated, both by the general public and even by those in a number of cases, who are placed in positions in which they are expected to safeguard the public interests, is amazing. This absolute lack of interest is due, I think, to a want of knowledge of the subject, rather than to a want of consideration of it. The old time "nuisance inspector" is responsible to a very great extent for this state of affairs, as are the authorities who impowered him to inspect meat and pass judgment upon it.

To procure for the people of this country or any country (and the people of this country are just as much entitled to protection from eating unsound meat as any other), a pure and wholesome meat supply, based upon scientific, economic and practical principles is a stupendous question. A great deal of the difficulty would be overcome by a vigorous campaign of education among the public. The great need of this is evidenced by a little con-

versation on the subject with the laymen with whom we come in contact daily.

"The slaughter of food animals in this country may be divided into three classes: (1) The large wholesale and packing house; (2) the small wholesale town and city butchers; (3) the farm slaughter."

While the large wholesale and packing houses are subject to government inspection, numbers two and three are in the majority of cases subject to no inspection whatever, or if there is any attempt at inspection it is probably carried on by a sanitary inspector or perhaps the local veterinary surgeon, both of whom can only devote a portion of their time to the work and whose knowledge of the subject is just sufficient to make them dangerous both to the butcher and to the consumer.

While a considerable quantity of Government inspected meat is sold for local consumption within certain cities, a few facts in connection with our own inspection may prove interesting and show to what extent the public are dependent upon municipal inspection for the wholesomeness of their meat supply. Better or worse conditions prevail in all other towns and cities throughout the country, depending upon the location of a Government inspected abattoir within the municipality, population of the town or city, and the quantity of meat consumed, etc. We have in this city, as far as I can learn, the only attempt at a properly organized system of municipal meat inspection in this country, although with lack of proper regulations governing the markets, hours of killing, and the large number of private abattoirs, it is still quite inadequate.

There are at present, and have been for a year, four qualified veterinary inspectors in charge of two cattle markets and twenty-five slaughtering establishments within this city. Imagine what a staff of inspectors would be necessary to fully control the situation as it at present exists. Our system of inspection includes the antemortem examination of all animals exposed for sale at the markets. This examination is extremely important and valuable. It is made for the purpose of detecting and isolating any animal suffering from an infectious disease, such as Contageous Aptha, Anthrax, Foot and Mouth, Hog Cholera, etc., in which case a Government inspector is notified and the animal would be dealt with under the Contagious Diseases Act., in order to prevent infection of employees from those disease communicable to man, as Variola, Mange, Foot and Mouth, Anthrax; for the purpose of detecting any intoxications or septic conditions in which the internal organs and meat might show only slight symptoms; for signs of animals near to, and just after parturition, Retention of Afterbirth, Uterine and Vaginal Discharges, Actinomycosis, Mastitis, Diarrhoea, Bruises, Lameness, Immaturity, etc.

In the event of an animal showing any diseases, or condition, in which it is advisable to have it slaughtered under inspection, the owner is notified by the inspector and arrangements made for that purpose. If the animal is consigned to a Government inspected abattoir we take no further action.

In the absence of proper regulations governing the inspection at the markets, we have been severely handicapped, but by the administration of a little tact, we have been greatly aided by the butchers themselves, who very often notify us should they have purchased an animal showing in their opinion any evidence of being diseased.

It would be impossible in a paper of this kind to go into the details of the post-mortem examination. Suffice it to say that our methods are similar, as far as is possible, to those followed by the inspectors of the Federal Meat Inspection Service. The animal after being examined is knocked and bled. The head is removed and the lymphatics in that region, the tongue and masseter muscles are examined for Tuberculosis, Actinomycosis, Parasitic Cysts or Abscesses.

As the dressing of the carcass proceeds, each organ is examined as it is removed from the body, as are also the body cavities.

If lesions of disease are found in any organ or organs, these portions are condemned and destroyed and a careful examination made of the deep lymphatics and other parts to ascertain whether the disease be localized or generalized. Attention is also directed to the proper and cleanly handling of the meat, and in the majority of cases our advice is acted up-

on. I shall not enumerate the different diseases and conditions necessitating the condemnation of a complete carcass, but shall give you the results of our efforts during the first eight months of this year, that is, from January 1st to August 31st, so that some idea of the work may be gained.

The total number of animals slaughtered during the above stated period within the small private abattoirs of this city was 77,246, comprising:

Cattle	19,799
Sheep	24,765
Calves	15,599
Swine	17,263

The total number of animals slaughtered under our inspection was 18,168, or 23.5 per cent. of the total slaughtered.

		% of the total number slaughtered.
Cattle	4,980,	or 25.1
Sheep	3,927,	or 15.8
Calves	4,184,	or 26.8
Swine	5,077,	or 29.4

The total number of condemnations on post-mortem as unfit for food was 1,550, including the complete carcasses of:

Cattle	26
Sheep	6
Calves	85
Swine	12
Total carcasses	128

and 1,421 portions of the various animals. The percentage of animals showing evidence of disease upon post-mortem examination was, cattle, 9.1; sheep, 8.1; calves, 2.6, and swine, 7.8. The total number of carcasses examined, as well as it is possible to inspect a dressed carcass, and approved was 13,514.

The carcasses of all animals upon which a proper ante-mortem and post-mortem examination is held, and which are found to be fit for food, are stamped in red with the Department of Health stamp, bearing the legend Department of Health, Toronto, inspected and approved, and the number of the abattoir.

Tuberculosis was the most prevalent disease found, 347 animals being affected. Actinomycosis was next with 273; Parasites and Parasitic Cysts, 230; Abscesses, 131; Immaturity, 73; and the following diseases and conditions were responsible for the condemnation, complete or partial, of 192 animals:

Atrophy,	Imperfect Bleeding,
Hypertrophy,	Mesenteric Emphysema,
Cirrhosis,	
Adhesions,	Septicaemia,
Pneumonia,	Neoplasms,
Fractures,	Bruises,
Emaciation,	Jewish Inflation,
Fatty Degeneration,	Umbilical Phlebitis,
Cysts,	Found Dead,
Pericarditis,	Filthy,
Angiomatosis,	Eaten by Vermin,
Uraemia,	Dog-worried,
Hernia,	Decomposition,

We have also a system of post-mortem records whereby it is possible to identify any animal showing lesions upon post-mortem examination, the extent of the lesions, the owner, date of slaughter, disposition of the carcass, and by whom inspected.

It is possible, in addition to the actual meat inspection work, to trace out the localities from which tubercular cattle have come, and in this way valuable information may be given to the division of milk inspection.

It is gratifying to be able to state that on no occasion has there been the slightest friction between the butchers and ourselves, even when it has been found necessary to condemn whole carcasses of animals which may have shown no ante-mortem evidence of disease whatever.

This satisfactory condition of affairs can always be maintained if, as I have said before, a little tact is used, which in itself is a most essential qualification to the meat inspector.

Regarding other qualifications of a meat inspector, I hold most firmly to the opinion that no one but a veterinary surgeon is qualified to pursue this work.

He must be a graduate from some recognized college, and should also have to his credit the Dominion Civil Service examination on meat inspection. These views I know will not meet with the approval of everyone, but I express them nevertheless, feeling that, even with my comparatively

limited experience. I am justified in doing so on behalf of the stock raiser, the butcher, the public, and my own profession.

In the future, even more so than at present, it will be necessary for the veterinary profession to take a larger share in the work of those organizations which have for their aim the preservation of the health of the public.

During recent years it has been evidenced that where he has been appointed, the veterinary officer has a great function to perform in matters pertaining to public health.

No one is as well fitted from his knowledge of the diseases of animals, than the veterinary surgeon to assist in the prevention of disease being transmitted from the lower animals to man, through contact, or from the consumption of unsound meat or milk. What we desire and what we must attain is a recognized uniform standard of meat inspection, and co-operation between the Federal, Provincial and Municipal Governments.

How can we ever achieve this end if men who have little or no scientific knowledge of the subject are to be permitted to voice their opinions as to what regulations, bylaws, etc., should be put into force in connection with this most important subject.

It has been a past custom and one which is still adopted, to appoint what are called "practical men" as meat inspectors. Numbers of these men have been brought up in one or other branches of the meat industry, most frequently as butchers, and have gained from experience the ability to recognize good meat from bad, but not diseased meat. There are I know many such inspectors who are exceedingly capable, and I am not criticizing their work as far as it goes, but the knowledge of anatomy, pathology, histology, bacteriology, laboratory methods, contagious diseases, etc., which a meat inspector ought to possess, can only be acquired at a college and not alone in a butcher shop or slaughter house.

Any man who thinks enough of the veterinary profession in general and meat inspection in particular, to wish to acquire the knowledge necessary for the efficient performance of the work, has ample opportunity for doing so.

It is just as important that the butcher be fairly dealt with as the public, and he has no more right to suffer through unjust condemnation of his meat, than the public have to consume meat which should have been consigned to the tank. Many carcasses have, in the past, been condemned unjustifiably, due to the ignorance of the sanitary inspector and ridiculous bylaws which exist, and there is no doubt that many carcasses which ought to have been condemned have been passed.

This question is a most important one and it is to be sincerely hoped that it will receive due consideration when the time comes for the appointment of inspectors in the towns and cities throughout the Dominion.

If there is to be co-operation there must be a standard of qualification for inspectors.

I wish further to state that I do not consider all veterinary surgeons competent to inspect and pass judgment upon meat. This is a comparatively new branch of veterinary science and requires special study.

I was privileged to be present at a meeting of veterinarians not long ago, and after a most interesting talk on the question of meat inspection, a gentleman and successful veterinarian rose to emphatically state that he would not eat, nor did he consider it fit for human consumption, any meat of any animal, which on post-mortem examination showed the slightest lesion of tuberculosis, no matter how slight, or in what position or condition the lesion was. I pity the butcher who ever has to submit to an inspection such as that man proposed.

The evils of the private slaughter house are well enough known by almost everyone to need very much comment. If anything, the rural slaughter house has it for insanitary conditions. While the city slaughter house is generally located on a back lane surrounded by stables or dwelling houses, the one in the country is often found on the bank of a creek, or ravine, into which the offal is thrown and allowed to decompose if it is not fed to hogs, amongst which animals it is often responsible for the outbreaks of disease.

There are certain characteristics common to both city and rural houses. They are generally poorly constructed of cheap and absorbent material, and very unsightly, no protection against flies or vermin, dark, with but little, if any, accommodation for the butchers and on some occasions very little accommodation for meat.

Most frequently they are without cold storage accommodation, while the rural houses have generally no means for heating water, and sometimes very little cold.

Edible portions, such as hearts, tongues, livers, etc., are hung on dirty hooks, often immediately over the steaming intestinal contents and other offal. Fresh carcasses are hung close to heaps of offal, for lack of space, and are allowed to absorb the emanations from it. Foul smelling barrels are stood around on the killing floors, and blood and other offal is allowed to pass down the sewers. There is very often no drainage system whatever in connection with the rural houses. The slaughterers pay no attetnion to their personal cleanliness, and cloths which are used for the purpose of wiping the carcasses are put to other uses. Knives, choppers, saws, etc., are hung against filthy walls, or thrown upon the floor, and seldom cleaned.

The wagons used in the removal of offal are often in the most filthy condition and are generally accompanied by innumerable flies, and indescribable stench, and are made of absorbent material and often leaking. They should not be permitted upon the streets of any town or city. The small private butcher gets next to nothing for his offal and certain parts of it, such as the bloods, bones, tendons, etc., is an entire loss.

The driving of cattle through the streets of a city is always attended with danger to pedestrians, and serious damage to property often results.

In the warm weather the animals, after a chase of several miles sometimes through the streets, are in no fit condition for killing for a considerable time afterwards, and I have known of cases where animals have died on the street.

The cost of driving animals and the transportation in wagons of the smaller ones from the market to the slaughter houses is often considerale, and I am informed by a very reliable butcher of this city that his bill for the driving of cattle, etc., from the market to his abattoir for one year amounted to close on two thousand dollars.

In some cases the butchers have been ordered to move their slaughter houses to beyond the city or town limits. This is an absolute injustice and shows lack of knowledge of the conditions, and want of foresight on the part of those who are responsible for the demands. The slaughter house should be within the limits and, if properly constructed, equipped, operated and inspected, shall not exist as a nuisance.

They should not, for obvious reasons, be located in the business or residential districts, but they may be segregated where access to a pure and abundant water supply can be had and where a proper inspection can be maintained. I do not wish it to be inferred from my few remarks on the evils of the private slaughter house that all of these conditions are prevalent at one time in this or any other city. While certain of the establishments are far from ideal, and can only remain so on account of the material with which they are constructed and their locations, others are as nearly ideal as it is possible to have them under the circumstances, and the manner in which the meat is handled and prepared and kept is most creditable. But the private slaughter house must go.

The only solution to the whole problem of a pure and wholesome meat supply for the people is the construction and operation of public abattoirs by every municipality and district, where animals intended for food shall be subject to a thorough scientific and absolutely just ante-mortem and post-mortem examination. This examination can only be carried on by qualified veterinary inspectors.

Where the wholesale meat trade shall be concentrated and the handling and preparation of meat and its products from the time the animal is examined on the foot until the meat is loaded for distribution to the retailer, shall be under rigid inspection.

The construction, equipment and management of an up-to-date abattoir is a wide question in itself, but I might mention a few of the most essential features in connection with it.

Cleanliness is the very first requisite in an abattoir. "To put it shortly, by the elimination of dirt, cleanliness may be maintained." The location of the abattoir calls for consideration. It must be upon a dry site, where abundant sunlight may be had, with good railway facilities, and with room for expansion. Some authorities recommend the abattoir to be constructed outside of the city or town limits. I do not agree with this idea for reasons before stated. My personal opinion is that the abattoir should be placed upon a site if possible from which it may be viewed by the public. With a little artistic skill and small additional expenditure the building may be made attractive to the eye and the public may be tempted to know something of the internal workings. This should always be encouraged, and will help greatly in the question of education.

An abundance of pure cold and hot water is necessary, as is also a perfect sewage removal system, thus preventing contamination of the air or water. Proper ventilation is imperative so that all impurities from the air of the rooms may be carried off. Absolutely impervious materials are necessary in the construction of the different compartments. A well-equipped laboratory is also an essential and all modern conveniences for the comfort of the staff, the butcher and their employees should be supplied. It is also an important question, that none of those whose duty brings them in contact with the preparation of the meat, be suffering from any contagious disease.

This city is about to construct an operate a municipal abattoir, which, when completed, promises to be the most up-to-date on the American continent. It is to be hoped that ere long, every municipality in the Dominion will follow this example. We shall then be able to pass and enforce by-laws prohibiting the sale within the municipality of any meat which does not bear the stamp of a qualified inspector. This will put an end to the practice of shipping by rail and delivering in wagons throughout the city the meat of animals which have been slaughtered on farms and other places, under all kinds of conditions, and sometimes only to save the animal from dying of disease.

While we know quite well that a certain percentage of unsound meat and meat prepared under unsanitary conditions is being disposed of throughout the country, I think it would be unreasonable to close down on the smaller men until we can offer them better facilities for complying with the exacting regulations required in the production of meats. Take, for instance, this city alone. It would mean the closing down of an industry upon which a large number of the best citizens are dependent for their living, an industry involving the handling and slaughter of and all work pertaining to it of a hundred and twenty-five thousand food animals every year. By closing the slaughter house without providing other means of carrying on the trade, this vast industry would be immediately seized upon by the organized meat interest, which would be most undesirable. This is a most serious question and one which has a direct bearing upon the public health.

Since meat is the principal article of food of the working man, and the working man is the backbone of the nation, it is important that he be protected from having to pay an exorbitant price for his daily food. "The municipal abattoir will regulate very largely the price of meat by allowing the independent dealer the privilege of dealing with the consumer."

Let us, then, all join in the agitation for a perfect system of meat and milk inspection throughout the Dominion. Canada can then offer along with all her other great natural attractions and resources, the advantages of a pure food supply, which when all is said and done is the greatest asset any town, city, province or entire country can possess.

EDITORIAL

In 1911 compulsory vaccination against typhoid fever was ordered for the United States army, consisting of about 76,000 men. Nearly a year ago the navy authorities adopted a similar policy. Recently Surgeon General Stokes of the navy stated that not a case of the disease had occurred among the 64,000 enlisted men of the navy in the eleven months since vaccination. Army reports show similar immunity; of the 16,000 men mobilized in Texas in 1911 because of the troubles in Mexico, only one contracted typhoid during three months of camp life. In the Spanish-American war, with no such vaccination, 20,738 cases of typhoid developed and more than 80 per cent. of the total mortality was due to the disease.

Protective vaccination against typhoid has been steadily advancing in favor among medical men since its first trial on a large scale by the British army in the Boer war. It has also been used with satisfactory results in the French, Russian and Japanese armies and is said to be completely harmless. The operation is similar to that against smallpox, but produces even less inconvenience. Because of its results in the French army, antityphoid vaccination as a compulsory public measure is being advocated in France, where 6,000 deaths from the disease occur annually.

There is no better standard by which to compare cities than that of health. It did not use to be so. Health was once considered a personal matter, a thing which the city administration had no business to interfere with. A man's health was considered his own business, and his own habits were similarly regarded, no matter what effect it might have upon himself or upon the people with whom he came in contact.

But modern usage looks at things differently. If one had nothing but the death rate of a city or a country, he would have the best possible index to the value of its system of government, of course, taking into consideration natural differences of climate.

Now, here is a case; The death rate in Russia is 30.5 per thousand. That of England is 18.2. In Norway it is 15.9. The death rate in Russia has just shown an increase from 28.9 to the figure given above.

The most appalling facts are related about the deplorable condition of the public health in Russia. Epidemics, which other countries are able to restrain, are constantly sweeping off thousands of the people. They are increasing in virulence each year. In 1908 deaths from epidemics amounted to 338,281. They went up each year, until for the first ten months of 1912, the number of deaths from epidemic diseases had increased to 612,287. Housing conditions, in city and village, are indescribably bad and absolutely nothing is being done to remedy the situation. Now ignorance among the people has much to do with this, but in every community strict health regulations will bring a great improvement. A man must be prevented from doing anything that would injure anybody else. We have just begun to realize how far the application of that principle will carry us. Every man and woman must lend their influence to the campaign for proper laws and for proper enforcement of all sanitary measures.

The city should have strict ordinances but it is also true that government is what the people make it. No individual can hope to escape his share of the responsibility.

That modern athletics are not conducive to either health or longevity is a known and proved fact. The violent exercises, with special developments of muscles are alike injurious. In the naval academy it has been found that among the men now in service more than half of those who are in ill health are men who won athletic honors. Considering that the honor men were only a small part of the whole body this in itself is an indictment of athletics that is terrific. It is found that athletes are fifty per cent more liable to hardening of the arteries, due to the ex-

cessive use of the heart action. Albuminuria and tuberculosis are also among the maladies to which they are especially prone. These findings are serious enough to warrant their consideration by school and college men. The present system of over-training is to be held in abhorrence by thoughtful teachers and by parents and guardians. The ambition to excel in some feat of bodily strength or endurance can hardly be said to be a laudable one. Fortunately these objections can not be laid against the game of baseball, which does not call for such extraordinary or special development. There are plenty of good wholesome games and sports that pupils and students can enjoy. The boasted Marathon contests also, for the most part fall under the ban, even running is an excess when indulged in during such contests. The excessive speed means excessive use of the heart and the excessive use of the heart to sustain such violent exercise afterwards results in hardening of the arteries. Our whole modern athletic system needs to be revised, unless there are young men who want to sacrifice their health and die early in life for the sake of excelling in violent games. For most of us the price to be paid would seem to be too high for the honors and the rewards and the fame of the thing.

In his Kingston speech, Mr. Rowell, leader of the Opposition in the Legislature, promised that when the Liberals are returned to power, a labor and public health portfolio will be created. We do not know of a more important portfolio. It must, however, be conceded that the present government has vastly improved the conditions in this regard. The appointment of a separate department to control health matters has been a subject for discussion ever since the advent of the present administration, but instead of a health minister we have had the control of that work in the hands of the provincial secretary, who has done much to provide improved facilities for the care of the unfortunate. The Provincial Board of Health has competent officials and legislation has been devised to carry out their suggestions. There is a labor department also in connection with the office of public works. Mr. Rowell's idea is to bring the two together and he believes that there is enough work to keep one responsible minister busy. The suggestion is certainly worthy of earnest consideration.

In his efforts to scour up the Province and promote the general good health and welfare of the people, Sir James Whitney has lent his signature to a new clause in the Bake Shop's Act which is calculated to keep all diseased persons away from food either in the process of manufacture or sale.

It comes under the head of protection, and states that no employer shall knowingly permit any person affected with pulmonary tuberculosis, scrofula, or other communicable skin disease, to work in a factory or shop in which food or food products are manufactured, stored, kept for sale, or sold. The onus of cleanliness is placed upon the employer, who must also be well washed and free from disease.

Greater use ought to be made of school buildings as centres for recreation and of education for the neighborhood. We build costly and magnificent schoolhouses, and use them for fifty hours a week, leaving them idle in the evenings and on Saturdays. This is a huge waste. There should be lectures and entertainments in the evening. The playgrounds should be thrown open to all the children of the neighborhood at certain hours. The basements could be utilized for gymnasia and baths, especially in districts where poverty and overcrowding exist.

The objection is made that furniture will be destroyed, and that the caretakers would be overworked. The answer is easy. Buy more furniture and hire more caretakers. In what way could public money be more usefully spent than in furnishing the children in our crowded districts with recreation, and in educating newcomers into good citizens?

Forecast and Review

DOMESTIC

Baby Clinics.

Perhaps the most important work that the settlements of Toronto are doing, says The News, is that of furthering the cause of the babies of the city through their clinics. There is one of these at both the Evangelia and University Settlements. There ought to be twenty of them in the city; not so much for curative purposes as for those of education. The mothers of the poor need to learn a lot of things to bring children up safely through the perils that surround them through the conditions in which they are forced to live. That's where the clinics shine—in education. If you would like to see a sight very well worth while go down some afternoon to the University Settlement and ask them to let you peep in while they are weighing some kiddies and arranging their feeding, and giving out pure milk. There's a young doctor down there named Kendal Bates, who is doing more real good for the future of the city than lots of the chaps that are standing at the head of some of the city's spectacular charities. Cleveland is the best equipped city in the matter of baby clinics that I know of. It isn't merely a coincidence that it also has the lowest infant mortality on the American continent. We have a splendid children's hospital, but we need to do the preventive work that will prevent scores of kiddies having to go there at all.

Open air schools. Shall we get them? All those of us who have any sense are hoping so. Surely the hard work of Dr. Struthers must have made this plain to those who have the power. We are throwing up a lot of money for things not half so well worth while. If some people would only lock themselves up in a dark room for a day or so and think as hard as they are capable, they might emerge with just a little social issue. Because one man's children do not need an open air school is not any reason why other children do not. It is pitiful that so many men who have the power cannot see beyond the limits of their own families. I am told that Miss Rogers, the superintendent of the school nurses, wants them in Toronto. That ought to be sufficient. It is only simple justice to say that she is, perhaps, the best posted and most capable woman in a similar position on this continent. She stands away up on the social service roll of honor.

Health of School Children.

There has been some resistance, says the "Sunday World" to the demand of the school doctors for operations on children suffering from adenoids and enlarged tonsils. Poor parents were fined for refusing to carry out the order of the inspectors, and the question of the liberty of the parents in such cases is brought to the front. The board of education appointed medical inspectors to guard the health of the children and to remove defects. These inspectors, like lay people, are prone to err, but generally their judgment would be correct or they would not be capable of holding such a position. Many parents have gone past these inspectors and applied to their own family physicians. Not all medical men think alike regarding the utility of tonsils and many of them have advised against this surgical operation. If the word of the school medical inspectors is to be respected it will not do for parents to get a certificate of the family doctor that operations advised are not necessary. It is an established fact that adenoids have seriously weakened the health of pupils, but parents hesitate to submit their offspring to the knife. It looks to the "Sunday World" as though the will of the parents might very well be disregarded. If there must be an appeal from the decision of the school inspector let the city appoint physicians to whom that appeal may be made, but if every man or woman who objects on principle to surgical operations is to be allowed to stand in the way of their children's complete recovery from a serious condition

caused by the presence of adenoids and enlarged tonsils a state of affairs will ensue that will render nugatory the very useful system of inspection that has been adopted in the schools.

Erring Women and Insane Are Not to be Kept in the Jails.

"Prison" will soon be an unpleasant term of the past. With it will go its running mate, "asylum."

Hon. W. J. Hanna believes in being thorough. Having gone a long way in introducing humanitarian methods of taking care of criminals and scientific methods of looking after the insane, he is preparing to make the very words that have so long been associated with the old worn-out methods forgotten terms. The revised Acts now before the Legislature provide for the substitution of the word "reformatory" for "prison," and "asylums" become "hospitals for the insane," what they have been in fact during recent years, rather than asylums.

Apart from the question of names the revised bills introduced by the Provincial Secretary contain a number of important reforms. One of the outstanding is the provision for indeterminate sentences wherever possible. Persons are sentenced to provincial institutions "for a period of not less than three months and for an indeterminate period thereafter of not more than two years less one day." The Act is made to conform with the practice at the prison farm by which the Parole Board can reward a prisoner for proper conduct and give him a new chance in life.

The same principle has been included in the bill relating to the Andrew Mercer Reformatory for Females. This Act will also provide for a female being sent direct to the reformatory at the discretion of the magistrate, instead of to the common jail.

The word "asylum" is done away with and hereafter the provincial institutions will be characterized as "hospitals for the insane."

Toronto is directly affected by this legislation, and the new law is so drafted that it will be impossible to commit an insane person to a common jail in the Province of Ontario. The immediate effect of this will be to put to an end the situation in Toronto where insane persons are detained for long periods in jail while awaiting their trial.

The indeterminate sentence principle is also to be extended by the Ontario Government to the confinement of erring females in houses of refuge.

The Act respecting industrial refugees has just come from the hands of the Statute Revision Commission, but the changes in it are not of the usual verbal or legal character. The most important is one providing that where a female has been committed to jail, or is undergoing imprisonment she may, by the order of a police magistrate or an inspector, be committed to a House of Refuge for an indefinite period not exceeding five years. The present Act makes no provision for an indeterminate sentence, it being permitted to transfer females from jail to Houses of Refuge only for the remainder of their terms of imprisonment. The indeterminate sentence will allow of vastly more opportunity for reformative work among such unfortunates.

The new Act is an improvement on the old in that it permits the transferring of women prisoners on the order of an inspector of a House of Refuge. At present only a magistrate has that authority. The ages of females who may be so committed has been fixed at from fifteen to thirty-five years.

Another important provision permits the House of Refuge officials to detain an inmate where in the opinion of a physician she is, on account of natural imbecility, unable to take care of herself. She may not be discharged until the physician, with the approval of the inspector, gives authority.

Human Sacrifice.

Last year Council made a special grant of $3,000 for measures to reduce the high rate o finfant mortality in Toronto. The action taken then by the Health Department was sufficient to reveal how serious was the waste of child life, and how needless was this sacrifice. It is to be hoped that the estimates this year will include a sum of money sufficient to finance a strenuous campaign to save the

lives of children. In his inaugural address the Mayor made reference to this subject, but the strength of his recommendation was discounted by a statement to the effect that the record of infant mortality in Toronto compared favorably with that of other cities. If he had said that it was less disgraceful than that of Montreal, he would have been more than that of Montreal, he would have been more accurate in his description of the case.

Four babies under one year of age die in Toronto every day. Four valuable citizens are lost to the community, and four families are plunged into mourning. At least half of these deaths could be prevented. Dr. Helen MacMurchy has pointed out that it costs $50 a head to bury these children, and it would not cost $5 a head to save their lives. The rate of infant mortality is nearly 150 per thousand births. The causes of a high rate of infant mortality are well-known to all students of social problems. Ignorance of child hygiene, unsuitable diet, want of cleanliness, and restricted living accommodation; these are responsible for at least half the deaths of children under one year of age. The last cause will remain in operation until the housing problem is seriously taken in hand. The other three can be fought by visiting nurses in the employ of the city.

As a general rule mothers are anxious to learn how to care for their infants. Most of the books and pamphlets on this subject set forth ideal methods which neither time nor money will allow the ordinary mother to carry out. Advice is sought from neighbors, often with disastrous results. The women who has "buried six" is regarded in some districts as an authority on the upbringing of children. Sometimes mothers are advised to train their children early to take just what the family has at table. And the results are four white coffins taken in procession through the streets of the city every day. Council will do well to remember that where there is a high rate of infant mortality, there is also sickness, deformity and underdevelopment. The causes which are responsible for the deaths of infants stunt mental and physical growth, and impair health in many of the survivors. Nature will make a hard fight for life. For every child who succumbs a victim to misguided treatment, several will survive similar ordeals only to carry to their graves the marks of their early struggles. To stimulate virile and healthy growth in the community is more important than to resurface macadam roadways with bitulithic pavements. Human factor problems should take precedence, and the most important of these is the reduction of infant mortality to a normal minimum.

Pleads for One Purity Standard.

When Dr. Winfield Scott Hall, of Northwestern University, Evanston, Ill., would have concluded his third lecture to men in Grace Church last evening, says the Winnipeg Free Press, there were cries from his audience, which completely filled the auditorium and overflowed into the gallery, for "five minutes more" and the lecturer accordingly talked until nearly 10 o'clock.

The lecture last evening was essentially on "The Marriage Relation." Many things were told the men present that were undoubtedly new to many of them but at the same time were absolutely essential to marital happiness. The hygiene of the marriage tie was thoroughly discussed. "Too few people enter matrimony with an exact understanding of what it really means," said Dr. Hall. "What the man really should marry for is home and children. Nothing else. You'd think by the way a great many married people start out to live that marriage was a legalized prostitution. The marriage license is no license for a sexual debauch and nature invariably exacts a heavy penalty for such."

In the course of his lecture Dr. Hall declared "I cannot think that there would be a man in this fair city of Winnipeg who would seduce a fair young and innocent girl under any circumstances, either by first drugging her with intoxicants until her senses were dulled or by any other means. I will not discuss this subject at all. It is unthinkable. We will discuss the vices of young men; not their crimes."

Applause greeted Dr. Hall's appeal when he said, "Men, haven't we reached the period in the social development of this country when we can say 'let there be one standard of purity for our sons and our daughters?"

In closing the speaker asserted "I believe we have reached the time in our social development when it is up to us to teach our sons with the same care that we teach our daughters."

Citizens Must Aid the M. H. O.

In any city of size, says a writer in the "News," the most important problem is that of civic sanitation. Sewage disposal becomes a necessity, and some special measures must be taken for the protection of health and prevention of disease. The influence of a competent department of public health in combating the problem cannot be overestimated, but the complexity of the question demands the personal attention of every citizen.

Medical science has been long in realizing that greater even than the curing of disease is its prevention. Even yet the discoverer of a positive prevention is less known than the man who effects a cure. Edward Jenner, the discoverer of vaccination, by means of which smallpox, from being a universal scourge, has become a comparatively rare disease, is scarcely known by name outside of the medical fraternity. It was only with great difficulty that Jenner's views as to the efficacy of vaccination won general acceptance and the opposition has not yet been utterly conquered.

Public health, or sanitary science, presents a very complex face. It includes the consideration of all hygienic conditions detrimental to the physical well-being of the citizens—climate, soil, house sites, air space, water supplies, drainage, food supplies, the disposal of waste refuse and the management of infectious diseases.

Throughout the animal kingdom may be traced a growing dread of bad odors arising from refuse or excretions, until in the human race may be seen a decided abhorrence. Growing from this feeling, sanitary legislation was first adopted in the early part of the nineteenth century, following the rise of the germ theory and the discoveries of Pasteur and Koch. Impure milk and water supplies were shown to have a direct influence in the dissemination of disease and it was established beyond doubt that the fly and mosquito carried fever germs from the putrefying refuse that served them as a breeding place.

As yet, however, the movement is in its infancy. The people must be educated. Departments of health have been established in the large cities, but they have not accomplished the work as it was hoped that they would accomplish it. The great cause for failure is the lack of co-operation between householder and the civic departments.

Toronto has done much to secure an adequate system of garbage and sewage disposal. The ratepayers on New Year's Day passed a by-law providing for the installation of incinerators to cope with the garbage problem, and the sewage disposal plant at the foot of Morley avenue is now working, and is, to a high degree, dealing with the sewage.

But much remains yet to be done. In the report of the Health Department's investigations in 1910, it is stated that there are 1,348 dwellings with no drains in the house. Of these 619 are in the central district, which embraces St. John's Ward. 559 families, of 5,382 who were visited, have no water in their dwellings. An outside tap that serves possibly a half dozen houses is their only source of supply. Of the families visited, only 1,601 had baths. It is almost impossible to be clean and sanitary under such conditions as these.

The appalling lack of conveniences is also set out in figures. There were 2,251 inside water closets found and 2,207 outside privy pits. Of this number 716 were declared unsanitary by the inspectors. In this connection the figures recently compiled by Mr. Burton J. Ashley, of Chicago, showing the number of privy pits in various cities of the United States and the number of cases in which sewers are available for the draining of these outside conveniences might be of interest. The cities may only be identified by their population:

Population.	No. of Privy Pits.	No. with Sewers Available.
350,000	60,000	50,000
240,000	29,000	7,000
490,000	27,000	20,000
300,000	25,000	
96,000	15,000	10,000
50,000	13,000	500
40,000	6,200	3,000

Toronto's figures would be very hard to compute. There are at present 9,725 privy pits in the city and very few of these have any sewer connection. In considering these conditions, the average observer blames the tenant; the reformer, secure in his own innocence, blames the landlord; and the civic officials, in their desire to shirk the responsibility, blame both tenant and landlord. The real basis of the present conditions, however, is the lack of proper legislation, and the general lack of observance of what legislation is in force.

The problem then resolves itself into a question as to what is the best method of ensuring that the by-laws are kept. In Baltimore every policeman acts as a sanitary inspector on his own beat. He is familiar with conditions and reports accordingly. The notices from the department of health are served by the policeman on the beat, and, again, he serves a summons when one is necessary. When sanitation is represented by a blue coat and brass buttons, exhaling the very majesty of the law, the foreigner, and after all he is the chief offender, is impressed and acts accordingly.

In Pittsburg in 1911, it cost $212,000 a year to collect and dispose of the garbage and waste from a population of 655,000. The cost per head is a fraction over 33½ cents. In Toronto the cost in 1912 was $717,136, with a population of 450,000, or about a dollar and a half per head, over five times as much as in Pittsburg. Could not this be done much cheaper if the people co-operated more with the civic departments?

As I stated in another article the cleaning up of the city is not alone a financial question. It is a question of human lives—the life of the babe that you bend over each night. Of every thousand children born in Ontario during the last year 195 died before they had passed their first birthday. Many of these deaths are directly due to unsanitary environments when healthful inspection of the home, the environment, the social and other dependent conditions would have conserved their lives. The fly that germinates in your garbage pail amid putrefying refuse that reeks with bacteria, is the same fly that hovers over the carefully tended infant. Despite all precautions the fever germ takes hold and the home is bereft of its most cherished treasure—the baby.

But consider. Make an introspection, and negligence of all the laws of sanitary science will confront you, frantic mother, with the fact that your child's death lies at your own door.

We have in Toronto a competent Department of Health. We have the nucleus of an effective garbage and sewage disposal system. There is just one thing lacking—the co-operation of the citizens. See in these preventive measures a more efficacious solution of the problem of health than the greatest cure, and co-operate—not alone for the city's sake, but for your sake—the sake of your child and the future splendid manhood, and the sake of the nation whose greatest strength lies in its healthful, capable citizenship.

Most Up-to-date School in the World.

With accommodations for 5,900 pupils and 228 instructors, the Washington Irving High School was opened last Monday. It is an 8-storey building on Irving Place, between 16th and 17th streets, New York, and cost the city $250,000. Among its novelties are a theatre seating 1,500, a seven-room furnished apartment for the Domestic Science classes, a model baking institution for business students, a garment factory of many sewing rooms, a room for the study of animal life, an imitation department store for girls learning business methods, and a roof conservatory filled with growing plants. There are also basket ball courts, gymnasiums, shower baths, and lunch rooms in which 700 pupils eat at one time. William MacAndrew is the principal.

Toronto and Housing Reform.

Those who maintain that there is no need for housing reform in Toronto, should refresh their memories by reading

again the report on local housing conditions published by the Medical Health Officer in July, 1911. There is an impression abroad that we are not as other peoples; that all the blunders and follies perpetrated in the decadent cities of Europe are so alien to the Canadian temperament that there can be no need to guard against them in Toronto. It is said that this is a city of well-to-do, independent, home-loving people. A vast province lies at our backs. What need is there for overcrowding, for squalor? Foreigners who are unaccustomed to our standards of living may herd together for a time. But this tendency will pass as they become accustomed to the ways of their adopted country. It were folly to let such reasoning blind us to what is actually going on in the city.

According to the report, there were 139 families living in one room each in the central district, almost within the shadow of the City Hall less than two years ago, and we know that conditions have become worse since then. In the same neighborhood, 61 families were living in basements. What chance has a family to observe the rudimentary laws of decency and cleanliness when there is only one room for all the members to sleep in, eat and live in? To what standard of citizenship will the children develop? Many of the houses divided among several families had no water supply. The tenants had to go down the lane or street to a public tap for every bucket of water they needed. In a large number of cases the rooms were not even weather proof. Gaps in the walls were covered with rags of bed clothing. Yet high rents were being charged for these hovels. A dwelling near the City Hall had four feet of water in the cellar. The rent charged for this place was $20 a month. Altogether 390 houses were listed as being unfit for habitation and 2,133 persons lived in these. The authorities were not over stern in condemning dwellings. No house was put on the black list for one reason only. One house had been under observation for 40 years because the cellar became flooded at times by overflow from the sewers. This building was not condemned.

Lodging-houses were responsible for some of the most revolting conditions. Several people were sleeping in one dark room measuring 7 x 12 feet. A dark room is one without a window or skylight. There were discovered by the inspectors 109 overcrowded rooms. In one house 19 men were sleeping in 3 roms. In another place 13 persons were sleeping in 5 rooms; 11 of them were lodgers who were accommodated in the following manner: 6 men shared 3 beds in a room 9 x 12 feet, 4 men shared 2 beds in a room 9 x 10 feet, and the aristocrat of the neighborhood had a bed to himself in a room where he slept, ate and carried on the trade of shoemaking. Evidently conditions have grown considerably worse since the summer of 1911, for a few months ago Alderman Wanless found 100 persons sleeping in a ten-room house. The report said that these lodgers were not poor men, but were in receipt of wages ranging from $1.75 to $3.50 a day. The fact is that many workers in Toronto must lie down to sleep wherever they can get beds or parts of beds.

In 1911 there were 447 persons living in basements and 22 in cellars. The first number includes the 61 families living in basements in the neighborhood of the City Hall, to which reference has already been made. High rents and scarcity of accommodation drove people to live in these piggeries. A two-room shack was rented at $12 a month. It contained no sink and no conveniences. The floor was below the street level, and in wet weather it was under running water. Because of these disadvantages the dwelling was rented at a price which should have secured a comfortable six-room house.

Anyone reading this report carefully will have no doubts left concerning the existence of slums in Toronto. Here is one of the conclusions reached by the Medical Health Officer: "What we have read of with disgust as having happened in the cities of Europe in the Middle Ages, happens in Toronto now before our very eyes." What was happening two years ago when inspectors were collecting information for the report was mild in comparison with conditions existing to-day. English cities are spending millions of pounds to alter slums—which are similar in every respect to those which are growing so rapidly in Toronto at present.

FOREIGN

Congress of Hygiene.

The United States will be the meeting place of the Fourth International Concongresses have all been held abroad, the first at Nuremberg, in 1904; the second at London, 1907; and the third at Paris, 1910. The 1913 congress will be held at Buffalo, on August 25-30. It is the object of the congress to bring together men and women interested in the health of school children and to assemble a scientific exhibit representative of the most notable achievements in school hygiene. It is believed that the present wide-spread interest in health education will make the exhibit a particularly attractive feature of the congress.

Twenty-five nations have membership in the congress and it is expected that all will have delegates at Buffalo. The secretary of state has officially invited foreign governments to participate. Invitations have also been issued to the various state and municipal authorities, and to educational, scientific, medical and hygienic institutions and organizations. The president of the congress will be Charles W. Eliot, president emeritus of Harvard University; the vice-presidents, Dr. William H. Welch, of Johns-Hopkins, and Dr. Henry P. Walcott, of the Massachusetts Board of Health. The long list of honorary vice-presidents include: Dr. Abraham Jacobi, of New York; Dr. William H. Burnham, of Clark University; Cardinal Gibbons, Dr. P P. Claxton, United States commissioner of education; Surgeon-General Blue of the public health service; Dr. H. M. Bracken, of the Minnesota State Board of Health; President David Starr Jordan, of Leland Stanford Junior University; Dr. Woods Hutchinson, representing the National Education Association, and many other distinguished physicians, educators and civic experts.

With the progress which has been made on these lines throughout the world in the last decade, the forthcoming congress should be of untold benefit to the people of this country, which is already well advanced in this science, but there is room for a great deal more improvement.

No "Tainted" Money for Old Uncle Sam.

Machinery for laundering currency notes, including National Bank notes, has been perfected across the border. A number of machines have already been constructed, and the complete number will soon be ready and put into operation. The treasurer's office and all the sub-treasury offices either are or soon will be adequately equipped for this interesting service—which in the end will furnish to the people a complete and constant supply of clean currency. This reform, besides its other advantages and attractions will mean a saving to the government of more than $500,000 per annum. It is expected that the laundering machines will in time be adopted by the larger banks, clearing houses, and the larger retail stores.

Sanitation in Construction.

A bulletin recently issued by the Michigan State Department of Health makes note of the remarkable fact that the plans of all jails in that State are subject to the approval of the State Board of Health, while school houses may be built without any sanitary supervision whatever.

The bulletin states that the board lately condemned a county jail because some of the cells were below the ground level and not in sanitary condition. The county was compelled to build a new jail. In the same county, however, "there is a schoolhouse which has a basement room lighted and ventilated by five small windows, and in this room are crowded fifty-five small children." The Board of Health is without legal power to rectify this condition and the bulletin aptly inquires: "If the State can protect criminals, why can't it protect school children?"

As a matter of fact, there are a good many States which are making no particular effort to protect the health of either class. Jails should be sanitary and schoolhouses should be sanitary. If there is to be discrimination between the two it should be in favor of the schools, for the schools house more people than the jails, and as a class it is more important to conserve the health of school pupils than to look after the comfort and bodily welfare of the jail population. Both as to schools

and jails, however, there is great room for improvement from a sanitary point of view.

In the erection of public buildings sanitation should be kept in mind. It involves little more of trouble or expense to build right than to build wrong—and the house that is built right is infiinitely better. If it costs more it is worth more.

Feeble-Minded Children in the New York Schools.

Fifteen thousand boys and girls, or two per cent. of all the school children in New York City, are feeble minded, according to Dr. Henry H. Goddard, Director of the Department of Psychological Research of the New Jersey Training School for Feeble-Minded Boys and Girls, at Vineland, one of the eleven educational experts employed under Prof. Paul H. Hanus, of Harvard, to investigate the public school system. His report was made public recently by the Committee on School Inquiry of the Board of Estimate.

He says the city has no adequate facilities for handling this tremendous number of feeble-minded children; that its institution on Randall's Island is looked upon by parents generally with distrust; that the feeble-minded and normal children are as a result often herded together in the same classes in the public schools, and that the feeble-minded are drilled in the abstract and to them utterly incomprehensible three R's, when they should be taught only manual and vocational subjects in home schools specially provided for the feeble minded.

Of the 15,000 feeble-minded children in the public schools of the city, the report states that only 2,000 are in the ungraded classes at present provided. The presence of such children in the normal classes, Dr. Goddard says, handicaps both the feeble-minded and normal pupils and the teachers of those classes as well. There is no adequate method at present, he reports, for discovering the feeble-minded and segregating and caring for them.

He recommends a new system of supervision, more effective medical examination, better equipment of the classes, organization of special schools, and a thorough method of statistically "following up' 'of the feeble-minded pupils after they leave school. At present, he says, some of the feeble-minded children get into high school because, as one teacher explained, "they are not allowed to stay more than two years in any one grade, and so are promoted whether they are fit or not."

Dr. Goddard mentions two solutions that have been proposed with regard to feeble-minded children — Permanent segregation and surgical sterilization.

"Having accumulated the facts," he says in his report, "and having sufficient knowledge of the problem, we should work toward institutions or colonies for the segregation of these people.

"It is most unfortunate that the one institution which the city supports for that purpose should have such a reputation as to make this solution difficult and often impossible. Until we come to the point where we decide to take these children forcibly away from their parents, whether they are willing or not, everything depends upon winning the parents' consent: and this can be done if the institutions are conducted in the right way, and if entrance to them has been made simpel and pleasant.

"The City of New York has an institution for the feeble-minded at Randall's Island . As to the character of that institution, I am not expressing an opinion; but it is unfortunately true that in the popular mind its reputation is not good.

"In the present condition of society neither of the two proposed solutions is applicable to any considerable proportion of these 15,000 children. They can not be placed in institutions or in colonies for the reason that their parents will not consent. They can not be sterilized for the same reason.

"We need a great deal more knowledge concerning the effect of the methods of sterilization, so that we may speak with assurance when it comes to the question, 'Shall this person be sterilized?' and so that we can predict exactly what will be the consequences."

It is clear, Dr. Goddard says, that feeble minded children are at all events not proper candidates for such education as the public school is now able to give and do not belong in the system. He recommends that there be established separate schools for the feeble-minded under principals

who are expert in that work; that these schools be developed into home schools, keeping the children as many hours as possible and many of them even over night; and that ultimately they be made stitutions, he thinks, could be made so attractive that parents would be eager to have their children there, and wherever the children become trainable to such an extent that they are earning something, it might even pay the city or State to make some return to the parents if their plea should be that they want to take the children home because of what the children can earn toward the family support.

Dr. Goddard suggests that in order to procure efficient and well-trained teachers for the special schools for defectives, the new model Letchworth Village in Rockland County, for which the State Legislature appropriated $457,000 for new buildings for defectives at its last session, be made also a training school for such teachers, and that other institutions be established along similar lines.

Sanitary Drinking Fountains are Not Always Sanitary.

The so-called sanitary drinking fountains, which are now being installed at all railway stations in the United States, following a recent order from Washington, may be more sanitary than the old-time drinking cups but the latter certainly had the advantage that everybody knew their purpose and used them accordingly. This is something that holds not true in the case of the fountains, a fact that is being daily demonstrated at all places where a common water faucet is not available besides the bubbling fountain. Water is being needed for other purposes besides drinking by the traveling public, and when one has observed people washing their hands at one of these places, he will likely walk a long way before he would ever drink from this fountain. Something worse than this, however, happened at one of the local railroad stations on New Year's Day, when a woman, who was traveling with a small child, succeeded in washing eleven child's napkins at one of the fountains, and then spreading them over the seats in the waiting room to dry. There were very few people in the waiting room at the time, and the matter was not reported to the officer until it was too late. A sign calling attention to the purpose of the fountain and indicating the location of the nearest water faucet, where water may be procured for other purposes, would probably solve the problem.

Spread Gospel of Sex Hygiene.

Sex hygiene and social ethics were discussed in a lecture by Miss Laura B. Garrett, of New York, recently in the Board of Health rooms, Newark, N. J. The speaker is a woman of wide experience in teaching this subject, and she briefly outlined her methods.

Besides members of the Health Board, there were present the Police Board and representatives of nearly every other municipal department, besides physicians and clergymen. The Board of Education was represented by Commissioner Tomkins, and Dr. George J. Holmes, supervisor of medical inspection.

For more than a year a committee, consisting of members of the Board of Health and citizens, asked to serve, have been quietly preparing a campaign, having for its object systematic welfare against the spread of certain diseases. The teaching of sex hygiene was considered as the best means of obtaining results.

This committee has been known as the "vice committee," but recognizing the fact that this name was hardly suitable, a sub-committee was appointed, with Dr. Henry J. F. Wallhauser as chairman, to find a more suitable title. At the suggestion of Miss Garrett, the name chosen was the "Committee on Sex Hygiene and Social Ethics." The body will be of a permanent character.

Miss Garrett has taught these subjects in the schools of various section of the country, in private institutions and in orphanages. She uess simple stories of plant and animal life to teach the mystery of sex to the children of her classes.

Several of those present asked questions of the speaker when she had finished. Dr. Holmes asked if she believed the Normal School was the proper place to instruct teachers in the work of imparting knowledge to children. Miss Garrett replied that she believed it was, but that not all teachers should receive this instruction at first. Ones especially qualified should

be chosen, and later these teachers, acting as supervisors, could spread their learning.

To Check the Drug Habit in New York State.

Following a hearing before the Senate Committee on Public Health to-day it was decided to redraft the Boylan-Kerrigan bill, which is urged to restrict the use of habit-forming drugs. The measure provides for a series of blanks to be used by physicians who prescribe dangerous drugs. It also provides for consultation with another physician or the Board of Health when a physician has been prescribing for three weeks opium, cocaine, or other drugs classed as habit-forming. Drs. Bush and McDaniels, members of the Assembly, and Dr. Peckham, a Senator, expressed the belief that the bill was so complicated that it would not accomplish the results intended by its sponsors.

Charles B. Towns, who favored the bill, said he would accept the suggestions of the critics of the bill, his object being to impress the physicians with their responsibility for drug habits. It was agreed that Drs. Bush and McDaniels should consult Dr. E. H. Porter, State Commissioner of Health, and other physicians with a view to preparing a practicable measure for the restriction of the drug habit.

Welfare Work of Steel Corporation.

A handsomely illustrated booklet issued by the United States Steel Corporation deals with the work of the "Bureau of Safety, Relief, Sanitation and Welfare." According to this publication, the aggregate expense of the corporation yearly for the improvement of conditions among its workingmen amounts to $5,450,000, of which the employers' stock subscription plan costs $750,000; relief for injured and killed and their families, $2,000,000; accident prevention, $750,000; sanitation and welfare work, $1,250,000; pension fund for superannuated employes, $700,000.

Among the welfare features adopted and installed by the company are mentioned: "Emergency hospitals, drinking water systems, sanitary drinking fountains, ventilating and cooling systems, swimming pools, athletics, ball grounds, shower baths, club houses, children's play grounds, plots for vegetable gardens and improved dwellings." All of these improvements have been introduced in Alabama by the Tennessee company.

Owing to safety appliances the fatal accidents in 1911 were 27.27 per cent. less than in 1910. The booklet has dozens of cuts showing safety appliances in mine, mill and furnace.

The United States Army and Anti-Typhoid Vaccine.

Major F. F. Russell, a surgeon in the United States Army and Professor of Bacteriology in the Army Medical School in Washington, in his lecture recently before the Harvey Society in the Academy of Medicine, told how typhoid fever, the scourge of the army and navy, practically had been eliminated from both branches of the service with anti-typhoid vaccine. The same results could be effected throughout the country, he said.

At first there was some danger in the use of the vaccine through lack of practical knowledge of the quantity required as a dose. This had been overcome by experience. The only risk now to guard against, Major Russell pointed out, was low vitality in the patient at the time of inoculation or reinoculating too quickly after the first treatment.

"In 1909 we began the treatment, after submitting the matter to a board of officers as we desired the support of the medical profession of the country," said Major Russell. "It was a subject of the greatest importance. We could not afford another experience like that of the Spanish-American War.

"But volunteers for the experiments were not readily obtainable. The vaccine was first tried on the laboratory staff. Then the medical officers in Washington, their wives, and children offered themselves as subjects, and some of the private physicians, and in 1911, practically every garrison has been vaccinated.

"Not until the troops were mobilized in Texas for the manoeuvres, however, was the rule for vaccination with the anti-typhoid vaccine made compulsory. Sixty thousand doses were served to the troops in Texas and on the border, each man being inoculated three times, the entire

treatment covering a period of twenty days. Although the soldiers mingled with the people of San Antonio and other cities where sanitary conditions were not always of the best in food supplies, water or surroundings, and where typhoid prevailed as a general thing, there were few cases in the army, whereas in the Spanish-American war one-fourth to one-third of the men were affected.

"Smallpox practically has disappeared, and so may typhoid be banished by this new treatment."

Major Russell showed by charts the gradual disappearance of typhoid from the army, beginning with the old forms of treatment in 1901, when, with 26,000 troops, there were 250 cases of typhoid and 17 deaths. During the present year, with 58,000 troops, the largest number under experiment and used as comparison with any previous year, there were only 15 cases and 2 deaths from typhoid.

"We have not yet found any diminishing force in the inoculation after four years." Major Russell said. "The best treatment," he said, "was found here to be in the use of three doses, while in England the medical authorities recommend two.

Only two physicians in the Army Medical School refused to be inoculated, and curiously enough they were the only two persons affected by typhoid during the school term," said Major Russell. He said the time probably had not yet come when this vaccination should be made compulsory throughout the country, but he suggested that its use could be put into effect under certain conditions of the great good to the community by local authorities in lumber camps, asylums, workhouses, almshouses, mines, and among travelers, who were liable to be infected by conditions met with away from home.

"Home is the safest place for us but that is where few of us stay," continued the Major. "Medical men advise their patients to go to the country or to the sea, and frequently go there themselves, where often typhoid awaits their coming."

Recommending that the country take up National sanitary work and the fighting of typhoid, Major Russell said it would probably be many generations before this country would be as clear of typhoid as England and Germany.

"Sanitary administration in this country has no National organization or force behind it to make it generally effective throughout the country," he said. "Many of the States have no sanitary system, and we see the doctrine of home rule in this respect carried to the point of absurdity."

America's Typhoid Plague More Deadly Than Cholera.

The discovery of a single case of cholera on board an incoming ocean liner fills the American public with alarm, says the Chicago Examiner. Yet this same public displays the most surprising indifference toward the ravages of typhoid fever, which is year after year taking from us the heavy toll of twenty or more deaths from every 100,000 of our population.

From January, 1907, to October, 1911, there occurred in Russia 283,684 cases of Asiatic cholera. This included the appalling epidemic of 1910. According to a conservative estimate the United States had during the same period 1,250,000 cases of typhoid fever, or more than four cases of typhoid fever in this country for every case of cholera in Russia.

When Italy was ravaged by cholera in the years 1910 and 1911, there were 16,000 cases of the disease, with about 6,000 deaths. In the United States, during the same period, we had more than 500,000 cases of typhoid fever, with 50,000 deaths.

Although the death rate from cholera is higher for the same number of cases, typhoid fever is really a more serious and a far more costly pest. It is transmissible in more ways; it is more expensive one account of its habitual lingering course, and it is infiinitely more disastrous in its after-effects than Asiatic cholera.

The 25,000 deaths from typhoid fever annually by no means represent our total loss. There are 250,000 cases of the disease every year, and each case necessitates an average of four to eight weeks' absence from work. This waste of energy together with the cost of medical attendance and hospital care, and the loss due to decreased earning capacity during convalescence brings the amount which typhoid

fever costs us every twelve months to not less than $100,000,000.

The complacency with which the average American citizen views this prodigious waste is all the more remarkable when we consider that typhoid is, to a very great extent, a preventable disease. Attention to the simplest requirements of sanitary science would reduce the number of cases by 175,000 a year, and the number of deaths which could be so avoided would reach a total of more than 160,000.

Let Us Drink.

It is to be sincerely hoped that some member of the legislature will introduce a bill at the present session which will make provision for supplying drinking cups on the railroad trains in this state, says the Lansing, Mich. "Journal."

When the legislature passed the law abolishing the public drinking cup it did an excellent stroke of work but the measure should never have been left as it is. For while the public cup was abolished no provision was made for supplying individual cups and the result is known to everyone whose work or pleasure takes them on journeys in the state.

If one has the wherewithal with which to ride in parlor cars, he may secure a glass from the porter—for a small consideration. But if one rides in the day coach he must either produce his own cup or go thirsty.

There are a number of devices on the market for vending paper cups. The railroads, however, have steadfastly refused to introduce any of them on their trains. We will not charge them with getting a rake-off from the porters but we do not doubt that their action in the matter is pleasing to the soft-footed "George" or "Joe" which ever the case may be.

If some legislator pants for a niche in the hall of fame and has found nothing with which to elevate himself in the minds of his constituents, we would call this subject to his attention. It may seem to be a small thing but, believe us, the member who pushes through a bill making it possible for the average American citizen to quench his thirst on railroad trains, will receive the grateful thanks of thousands who will never hear his name in the future without calling him blessed.

Aim to Control Milk Supply at Dairies.

Representatives of eight Eastern and New England States, and Federal Government Agents met recently at the Academy of Medicine in conference with the New York Milk Committee to discuss the improvement of State laws for the control of the production and handling of milk. Plans of uniform State legislation were agreed upon and as a result it is likely that the condition of the 40,000 dairies in the seven different States from which New York City now gets its supply will be improved.

Most important of the recommendation and grading of all dairy herds, buildings, equipment and methods of collecting milk and the classification of all milk delivered in the market. At present there is a grading of milk in New York by the municipal authorities, conducted at an enormous expense for inspections. At yesterday's conference it was agreed that the various States should have control of all inspection thus doing away with a duplication of many inspections now conducted by municipalities.

"These delegates, appointed by the Governors of the various States," said Dr. Charles E. North of the New York Milk Committee who was chairman of the conference, "have gone further in their recommendations for improved conditions than ever was proposed before. There is no State in the Union where conditions approach the ideal standards set to-day. The best conditions existing anywhere, I think, are in Pennsylvania, but we know that those conditions pertain only to the milk that is produced in Pennsylvania for consumption within that State. Specific orders are given not to inspect the milk that is shipped to this city. The attitude in the past has been one of opposition between Boards of Health of cities in different States. Now we propose to get together, realizing that uniform inspection will be best for the health of all."

There should be three classifications of dairy herds, according to the opinions expressed yesterday. Class A, should include herds which had been both tuberculin and physically tested; Class B, those not tuberclin tested but physically perfect; and Class C, those neither tuberculin nor physically tested.

It was proposed that State Inspectors should divide all milk into three classes. Class A milk, it was agreed, should consist of raw milk from Class A herds, being free from dirt and having less than 100,000 bacteria per c. c. as delivered to the consumer; or pasteurized milk from Class A or Class B herds. Class B milk, it was agreed, should contain no more than 1,000,000 bacteria per c. c. in the raw state, whereas Class C milk should include all milk not conforming to either of these sets of requirements.

A heated discussion was held over the question as to what department of the State should have control of the inspections of dairy farms. It was finally decided that the State Boards of Health in the various States should have supervision of the medical inspection of dairy employees and milk handlers at creameries and shipping stations, of the sanitary inspection of human dwellings ,water supply, drainage systems, milk houses, shipping stations, and factories, as well as to conduct all laboratory tests of milk. It was agreed that Departments of Agriculture, or, where such a department did not exist, the State Cattle Bureaus should attend to all veterinary inspections of dairy cattle as well as all sanitary inspections of dairy barns and their surroundings.

The pet scheme of the New York Milk Committee for a State Milk Board which should serve as the organization for carrying out a centralized State milk control, was shattered by the arguments of the delegates. The bill which is soon to be presented in the New York Legislature, drafted by the New York Committee, provides for such a board.

It was agreed to support as a substitute for a State Milk Board, State control centralized in the State Department of Agriculture.

"The State Health Session."

The hearings before Gov. Sulzer's special Public Health Commission have already revealed the desirability of Statewide health reforms. The State officers are said to be underpaid, many are inefficient, and the lack of close co-operation between the State Department and local health officers through widely scattered areas shows the need, according to experts of a "State Public Health Session" that will co-ordinate these dissociated agencies into an effective sanitary instrument.

The investigating commission, headed by Dr. Herman Biggs of New York City's Health Department, will report upon the proposed reorganization. Dr. Chas. F. Dolduan, closely associated with Dr. Biggs in the Health Department, discussed the subject before the last meeting of the American Public Health Association, in which he pointed out that reforms which have been successfully prosecuted in Germany and Great Britain were applicable here. The counties can be made units of administration larger and more effective than the cities and towns now under petty health boards with insufficient powers. The health officers would be Doctors of Public Health, appointed by the Board of Supervisors from an eligible list of medical officers of health prepared by the State Board of Regents. They would have no private practice. In the current number of the New York Medical Journal it is specified editorially that, whatever plan may be finally worked out, it should embrace:

1. Trained public health administrators devoting full time to their work.

2. Administration on larger, probably county, lines.

3. A uniform public health law throughout the State in place of local rules and regulations.

The present village health officers would be retained, with their present status of medical and sanitary inspectors, to visit cases of infectious diseases, provide for isolation and disinfection, and report to the county officer, who would be directly responsible to the State Commissioner of Health. The "Health Council," consisting of five county health officers selected by the State Health Session, would wield its powers throughout the year in regulating inter-county public health affairs. The county system would be adjusted to local needs, without too great centralization.

We have already pointed out that the present loose administration of local health problems is responsible for the in-

fection of large populated areas from the rural districts. The new system proposed has already worked well in the older civilized countries.

Danger in Finger Bowls.

Dr. Lavinder of the federal public health service says the restaurant finger bowl ranks with the common drinking cup and the roller towel as a spreader of disease. He declares that "in many supposedly high class restaurants there are in use only about a dozen finger bowls and these do service for many patrons."

In the "supposedly high class restaurants" of which this declaration is true it is not true that the finger bowl is in the same class of disease spreaders as the roller towel and the common drinking cup. On the contrary, it is in a class by itself. For besides acting as a spreader of disease it has spread disease among careful persons. Many eminent citizens have either been born with or have acquired a veneration for the finger bowl. They have regarded its use as combining elegance and prophylaxis, from which lofty shelf Dr. Lavinder has knocked it.

Now the Broom and House Cat Must Go.

The second of the series of meetings held by the public health education committee of the New York County Medical Society at the Academy of Medicine yesterday afternoon developed some new theories of household hygiene and relegated to the land of germs certain established household institutions.

Dr. John Van Doren Young, speaking on the subject of "Hygiene in the Living Rooms," disparaged the broom and accepted the vacuum cleaner as the only sanitary method of cleaning house. So far as he could see, he said, the only use for a broom at the present time is to cover it with a flannel cloth and dust down the walls with it.

As for beating rugs and shaking dust cloths from open windows, it is nothing less than an absolute disregard for the neighbors' health, he said. Dust cloths should be washed, he said, and not shaken out upon the neihgbors.

What may have been taken by any of the many young women in the audience as timely advice for the furnishing of a home was Dr. Young's statement that more people made the mistake of having too much than too little furniture.

"Buy as little as you can," he said, "and as good as you can. Remember that a lot of furniture means a lot of work and that means expense."

And alas for the family cat!

"From my standpoint New York apartments are not qualified for housing domestic pets," he said, "unless they be canary birds and gold fish."

Dr. Henry L. Shively spoke upon the "Hygiene of Sleeping Rooms and Bath," and prescribed a minimum of two hot baths per week.

There is sound physiological reason for the daily bath, he added. It produces a healthy skin and prevents glandular diseases. Cold baths, however, should be restricted to the robest who are free from organic disease, he said. In any case the cold bath should not be of long duration.

Dr. Shively said that there should be no carpet or matting on the bedroom floor and advised in their place cotton rugs which can be washed easily. He said bedroom closets should not be used as repositories for old shoes and soiled clothes, and where two people sleep in one room he said that they should have separate beds.

Fresh air, he said, was a cure for insomnia, but people who threw their windows wide open or sleep out of doors should be careful to be properly clothed.

In her discussion of "Hygiene of the Kitchen and Cellar," Dr. Laura M. Riegelman said it was surprising to learn that back of many of the wealthy homes of New York there are cleverly concealed cisterns which are breeding disease. She said further that there is no blessing like a large kitchen, and yet that very few New York apartments furnished them. A good coal range is the best appliance for cooking, she said, yet in many of the apartments there are only gas ranges. If gas ranges are used there should at least be chimney flues, she said, to carry away the odors of cooking and the smoke.

Cheap at Millions if it Cures.

The offer of Charles E. Finlay, president of the Aetna National Bank, of New

York, to pay $1,000,000 for the establishment in America of the tuberculosis cure reported to have been discovered by Dr. F. F. Friedman, of Berlin, if it proves beneficial in 95 out of 100 test cases, could probably be duplicated in several other countries. It is a manifestation of the intense interest taken throughout the civilized world in the search for means of overcoming the terrible "white plague."

Thousands of rich men and millions of the poor are as deeply concerned as Mr. Finlay in the fight against the destroyer which kills more human beings than fall a prey to any other disease. In proportion to their means they would give as liberally to conquer this most dreaded foe of life. There would be no limit to the financial resources which might be bought into use if money would insure the final victory of science over tuberculosis.

All attempts to calculate the economic burden of this plague run into staggering figures. It is a tremendous tax upon industry and every form of material advancement. Its effects are felt in every community, however small, and in all countries. The world would find its progress much quickened if it could be freed from the most destructive of diseases.

But there is an "if" of tremendous importance in the proposition President Finlay makes. It is by no means certain that the hopes raised by the Friedman treatment for tuberculosis will be realized. The highest scientific authorities have not yet placed their guarantee upon the new serum. The tests made have not been long enough and public enough to clear away grave doubts. The offer made by the New York banker, is one of many factors in the problem which will tend to a speedy determination of the exact results of the Friedmann remedy.

It cannot be long before the true value of the treatment will be clearly ascertained. Then, and not until then, will the world know whether it is a discovery worth untold millions or merely one of the numerous false beacons which have raised the hopes of millions of sufferers only to dash them to deeper despair.

Lectures on Welfare Work.

The New York University School of Commerce, Accounts and Finance in cooperation with the National Civic Federation has started a course of lectures on welfare work. Miss Gertrude Beeks, Secretary of the Employers' Welfare Department of the National Civic Federation, is directing the course of lectures, which will be held on Monday evenings in the next three months.

The speakers include William R. Wilcox, Chairman of the Welfare Department of the National Civic Federation; Gen. Lewis T. Bryant, Commissioner of Labor of New Jersey; Prof. Jeremiah W. Jenks of New York University; C. L. Close, Chairman of the Welfare Board of Safety, Sanitation and Relief of the United States Steel Corporation; John H. Derby Fire Portection Engineer; Dr. R. W. Corwin, general manager of the Sociological Department, Colorado Fuel and Iron Company, Pueblo, Col.; W. E. C. Nazro, architect and welfare manager, Plymouth Cordage Company, Plymouth, Mass.; John Mitchell, former President of the United Mine Workers of America; W. H. Moulton, Superintendent of the Welfare Department, Cleveland Cliffs Iron Company, Ishpeming, Mich.; S. T. Simmonds, Superintendent of the Welfare Department, Celluloid Company, Newark, N.J.; Miss Mary L. Goss, Secretary of the Welfare Department of the International Harvester Company, Chicago; the Rev. Frank J. Milman, Ph.D., formerly a miner, pastor of the Second Presbyterian Church, Newark, N.J.

Infantile Paralysis Germs Often Lurk in Nostrils.

Infantile paralysis may be communicated by persons who are not themselves subject to that dread malady, and yet may be the cause of infecting others, according to the researches of Dr. Simon Flexner, head of the Rockefeller institute.

This announcement is made by him in a paper published in the current number of the Journal of the American Medical Association.

It was found that typhoid fever could be transmitted by passive carriers, and the same amazing state of affairs now is indicated by Dr. Flexner in the case of poliomyelitis.

Associated with him in this work and coauthors of the article are Paul F. Clark and Francis F. Fraser. They have demon-

strated that the virus of the disease exists in the noses of some perfectly healthy persons who have been in close contact with those afflicted with the disease.

This affords an experimental basis for the belief, which is being fortified by clinical observation, that there are passive carriers of the infection.

Dr. Flexner reports that there was taken to the hospital of the Rockefeller institute a child 4 years old suffering from the paralysis, which prevented the use of the leg muscles and seriously interfered with her breathing. The mother and the father were taken in charge by the physicians, who irrigated their noses with salt solution.

The solution was passed through a filter of earthenware and some of the fluid was injected into the veins of a small monkey. The animal became paralyzed in the legs. Previous experiments have shown that the dust of rooms in which patients afflicted with poliomyelitis have been kept has contained the virus.

"The manner of the conveyance of the virus," continues Dr. Flexner, "is not yet wholly worked out. The presence of the virus has been established on the mucous membrane of the nose, throat and intestines of persons ill from poliomyelitis and on the mucous membrane of the nose and throat of monkeys in which the disease has been experimentally produced."

New Railway Department.

Dr. C. G. Elmore has just been appointed sanitary inspector of the Chicago & North Western Railway. He is to inspect and inquire into the sanitary condition of coaches and chair cars, paying special attention to the drinking water coolers and toilet rooms, particular attention being given to the cleanliness and disinfection of the cars themselves.

For the present his efforts will be concentrated at Chicago inspecting all equipment arriving at and departing from the new passenger terminal. His reports will be made in detail, giving date of inspection, car number, train number, together with recommendations for bettering its condition.

Frequent conferences will also be held with the foremen of the various coach yards, to suggest improved methods for bringing about the desired results.

Other division points will receive the same careful inspection in the near future and the list will be added to from time to time until the whole system has been thoroughly covered.

Campaign to Fight Disease in Factories.

To prevent death from disease in industry an active national campaign will be launched January 28th at the annual meeting of the Efficiency Society, a national association of industrial engineers, in its headquarters, the Engineering Societies' Building, No. 29 West Thirty-ninth street, N.Y.

Discussing the great need for such action, Dr. Winthrop Talbot, editor of Human Engineering, who is arranging the conference on industrial hygiene, said recently:

"Of the deaths in industry to-day seventy-seven per cent. are from disease. Half of these are preventable. The annual avoidable waste from preventable disease in industry is $200,000,000. These facts and figures indicate the pressing need of the application of efficient hygienic methods in industry.

"The Efficiency Society recognizes that a norganized effort must be made to meet the situation. Experts from all over the country will suggest curative and preventive measures."

Good News for Smokers.

During the cholera epidemic in Hamburg, Professor Wenck, of the Imperial Institute of Berlin, made the discovery that tobacco was fatal to the germs of that dread disease. The discovery of so simple a method of fighting the germs of cholera has been regarded as of great importance.

First it was noticed that many of the employes of a great cigar factory in Hamburg had been expoesd to the disease which had then become epidemic in that city, but that not a single employe was attacked. This led to various experiments.

In the first experiment a cigar was soaked in water containing about 2,000,-

000 cholera bacilli to the cubic inch and within the twenty-four hours every one of the microbes had died.

The cigars made in the Hamburg factory by workmen who had been exposed to the cholera were examined, and not one of them contained a live cholera germ, although some of them showed traces under miscroscopic inspection of the germs that had been killed by the tobacco.

Not only the tobacco itself was found to be deadly to cholera germs, but merely the smoke of the tobacco. Professor Wenck made experiments and found that cholera germs are destroyed in from half an hour to two hours in the smoke of Brazil, Sumatra and Havana tobacco.

Probably the most startling experiment was that of tracing cholera germs in saliva from the human mouth. Tobacco smoke killed these germs within five minutes.

Flogging for Drunkards.

Dr. Miller, lecturing before the London Medical Society, has advocated flogging for drunkards. He declared that the present system of treating drunkenness judicially is all wrong, because it began at the wrong end. When a citizen is brought up for the first time on a charge of drunkenness, he is admonished and allowed to go; the second time he is fined, and the third he is imprisoned. The first time the man is clearly culpable, the second time he is less accountable for his condition, and the third time he is a chronic drunkard.

The only thing such a man remembers, Dr. Miller said, is physical pain. It is the one logical deterrent for the chronic alcoholic, and it is the one not used. The reason for this is that we are too scientific and too sentimental. We are too white-livered to beat a man who beats his wife; therefore, in the name of humanity the wife has to go on getting beaten. It would be kind to flog the alcoholic early, whereas it is simply barbarous to imprison him later.

Insurance Act and Its Workings.

Mr. Masterman, financial secretary to the treasury, stated in the British House of Commons that the sums received into the national health insurance fund from the sale of stamps, etc., up to Jan. 18 amounted to £9,225,369. The amounts available for investment were being invested partly in treasury bills and exchequer bonds, and partly in government stock in anticipation of transfer to the permanent investment account.

The amount mentioned by Mr. Masterman is, of course, exclusive of the state contributions, always available for the payment of benefits. This contribution would bring the total sum up to at least £11,500,000 available for benefits under part I. of the act, viz., sickness, medical, and maternity.

Mr. Pell, the Unionist member for Yarmouth, also asked in the Commons how many persons were insured under part II. of the National Insurance Act, and how many had sent in claims for unemployment benefits to the latest date available.

Mr. J. M. Robertson, secretary to the Board of Trade: The total number of unemployment books issued up to Jan. 16, 1913, was 2,273,589, and the number of claims to benefit received up to the same date was 100,170.

The date mentioned by Mr. Robertson was the day after that on which unemployed benefit began to accrue. Those entitled to benefit as from Jan. 15 were insured persons who were out of work during the previous seven days, and had lodged their claims for benefit in that period. Persons whose claims are valid and who were still out of work, will now be paid 7s. benefit for the week at a labor exchange or local office.

Will Work for Cleaner Cities by Preventing Coal Smoke.

Coal smoke prevention is a subject, the Bureau of Mines has announced, at Washington, to be taken up at once, with a view to making American municipalities clean places in which to reside.

The bureau already has undertaken to discover a method of eliminating the smoke that forms in the combustion of practically all coals.

It is the plan of the bureau to find a chemical method that will be effective as well as cheap in overcoming smoke and soot, thus doing away with the present mechanical methods of prevention.

COMMENT ON BOOKS

[Any book reviewed in this department may be obtained direct from the publishers, or from leading booksellers, or through *The Public Health Journal*.]

Defending Child Labor.

In days such as these a great deal is written about child labor, and those who discuss it seem almost unanimous on its evils. They tell how it blights childish happiness and stunts growing frames; they dwell on the running it brings on the moral natures of its victims, and draw gloomy pictures of its effect on the future of the race. Yet, amid all this weight of evidence, one man has dared to life up his voice in protest. Thomas Robinson Dawley, Jr., in "The Child That Toileth Not," has discussed the employment of children in the cotton mills of the South and has compared their lot as they tend the spindle with the life they led on the mountain farms from which most of them came. He has gone into actual cases, and has spoken directly of factories and farms that he has visited, and he maintains that under certain conditions and in connection with a certain economic state of society employment for children in the mills is not only harmless but an actual blessing.

Mr. Dawley was one of the investigators sent out by the Department of Commerce and Labor a few years ago to gather facts about child labor. He traveled through the New South on this mission and made the observations that he was ordered to undertake; but when he reported his results and his strong opinion that child labor as he had seen it practised, far from being an abomination, was a direct benefit to the little employes, his views were ignored and his report suppressed. To obtain publicity for his observations and conclusions he has been obliged, he asserts, to issue this book himself.

Now, of course, the value of such a work as this is in direct relation to the qualifications of the author as a social observer. If he cannot observe correctly, he cannot draw adequate conclusions; and if he draws conclusions they must not be affected by partiality for one side or the other. When the report of Mr. Dawley is examined with the idea of testing its credibility, it at once appears that, if he set out to draw a biased picture, he adopted an unnecessarily difficult method to accomplish it.

For Mr. Dawley has not written an essay but an itinerary. He has described the places he visited apparently in the order in which he went to them, and he has mentioned a sufficient number of names of towns and factory owners, and has given sufficiently strong clues to the identity of many persons with whom he talked or whose mode of life he has analyzed, to make it easy for any one interested to check the statements he makes. Such a method is the most effective if the author is describing things as they are, but the most difficult and dangerous if he is forcing facts to suit his conclusions. Here and there the critical reader may perhaps consider that he detects a certain lack of experience in Mr. Dawley's writings and that traces of youthfulness are betrayed, but such faults as these detract nothing from the general effect of his testimony.

So it is worth nothing that Mr. Dawley has little but praise for what he saw of child labor in the Carolinas, Tennessee, Georgia and Alabama. He found that the cotton industry had been started in a region which, till the manufacturers came to it, was given up to such miserable cultivation as is associated with the Southern "mountaineers." Here and there, it is true, he came across in his travels a valley really well adapted to agriculture, and there the farmers were as well off as in any other district; but for the most part the descendants of the sturdy stock which settled the mountains were eking out the most miserable of existences on land for which they could by no possibility wring a decent living.

In many cases, Mr. Dawley asserts, they did not try to do even as well as they could. It was the land of "moonshine" whisky and family feuds, and from generation to generation the people sank into greater sloth and poverty and deteriorated physically, morally, and mentally under the strain. Even when the men had a job by which they might earn a few dollars they would throw it up merely

because a fit of idleness seized them; illegitimate children were considered no disgrace, and the women were too ignorant to prepare properly the scanty food they could provide for their families. If the author is to be believed, the one hope for this shocking condition of affairs in a corner of a civilized land was to remove bodily the population and to leave the mountains to fall back into their original state.

With this picture Mr. Dawley contrasts that of the Southern manufacturing towns and villages. There, he declares, the very men and women who have strayed and deteriorated in the hills have prospered in most cases amazingly. They have acquired standard of living and a proper amount of self-respect. The children, indeed, work in the factories, and he scoffs at the idea that there is anything detrimental about that. He takes up such phrases, invented by sentimental philanthropists and repeated ad infinitum by those who have never entered a cotton mill in their lives, as "baby toilers marching back and forth, mending broken threads," and the "injurious lint-laden, moist atmosphere," and declares that nowhere did he find anything approaching conditions like these. Indeed, he asserts that the factory work seemed to him to be easy and safe, the buildings far more sanitary than the shacks in the mountain, and the task of the children well within their powers.

Then Mr. Wawley has much to say of the schools, maintained by the factory owners for their boy and girl employes, and the evident affection that at one place the children had for the mill superintendent. He explains the fact that often the children are the breadwinners of their families by the impossibility of training a grown man from the mountains in factory work and the lack of sufficient jobs as laborers and watchmen for all who settle in the manufacturing towns. Finally he compare the way in which the factory children grow up with the evil lives of the young men who knock around refusing to work, and brings the serious allegation that in some cases professional charitable workers have foisted the photographs of these wastrels on the public as pictures of typical specimens of factory hands.

Mr. Dawley appears to regard all restriction of child labor as a mistake, and he dwells on several instances in which families have found themselves straightened by such employment laws as now exist. He is, too, very severe in his criticisms of the mission schools, started in the mountains by those who pin their faith on education as all sufficient to effect the moral regeneration of the community. Even if Mr. Dawley can bring a good deal of evidence to show that these worthy people are on the wrong tack, his views do not seem sufficiently digested or, indeed, expressed with sufficient particularity to meet with general acceptance.

Perhaps, however, the intolerance, of which it is impossible to acquit Mr. Dawley altogether, stands out more clearly than it should by reason of the method he has employed. He has indicated his views by merely reciting what he saw and heard and he has not reduced his opinions to formal statement. If he had done so he might have put in reservations and qualifications which would have altered materially the general impression made by his book. But he has undoubtedly gained force by this method of expression, and his conclusions are certainly worthy of close examination, and, if they cannot be refuted, of frank acceptance by those interested in sociology.

New Science Suggested to Solve Social Problems.

To sketch the outlines of a new science which is to intermediate between the modern laboratory psychology and the problems of economics," to show how the psychological experiment can be placed at the service of commerce and industry; in short, to awaken the public to the possibilities of "economic psychotechnics," this is the mission of Prof. Hugo Munsterberg's latest volume, "Psychology and Industrial Efficiency," just published by Houghton Mifflin Company of Boston.

Prof. Munsterberg has been tip-toeing about the various thresholds of this captivating idea for several years. "Psychology and the Teacher" applied laboratory psychology to pedagogical methods in still more drastic fashion than it had already been applied. "On the Witness Stand"

was published at a time when elaborate association and memory tests were being noted as the star feature of every well-regulated court room scene, and in "Psychotherapy," with its discussion of the efficacy of hypnotic influence, laboratory psychology was illustrated in its practical application to medicine. In fact, Prof. Munsterberg's hobby is application; he has a sound mania for "seeing how it works." In these three fields—education, jurisprudence and medicine—actual practice has vindicated the value of the psychological method. These, however, do not make up the totality of civilized life, and Prof. Munsterberg's aim is directed at no lesser mark.

"There is already far-reaching agreement that the problems of artistic creation, of scientific observation, of social reform, and many similar endeavors must be acknowledged as organic parts of applied psychology. Only one group of purposes is so far surprisingly neglected in the realm of the psychological laboratory; the purposes of economic life, the purposes of commerce and industry, of business and the market in the widest sense of the word."

In the first place, Prof. Munsterberg offers economic psychotechnics as the solution not only of the social problem of the round man in the square man, but of the man in no hole at all. His study of the economic situation has convinced him that the lack of fit human material to do the work of the world would not be felt so keenly if the "dispositions of the mind" the really decisive factor for the adjustment of personality and vocation, had not been so carelessly ignored. Society has made a grave mistake, according to Prof. Munsterberg, in allowing its youth to drift willy-nilly into industry, giving not the slightest attention to its "psychical rhythm."

Prof. Munsterberg awards to H. H. Emerson the clearest insight into the general economic situation and the efficacy of the psychological method to solve our present social problems. Mr. Emerson has the frankness of his convictions, and he has Prof. Munsterberg's approval when he declares that "it is psychology, not soil or climate, that enables a man to raise five times as many potatoes per acre as the average in his own State.....In selecting human assistants such superficialities as education, as physical strength, even antecedent morality, are not as important as the inner attitudes, proclivities, character, which, after all, determine the man or woman."

Prof. Munsterberg looks forward to the day of psychotechnical science when vocational guidance shall be a matter in the hands of the consulting psychologist and the laboratory; when the applicant for employment shall present not only the vague recommendations from former employers, but an analysis of his physical make-up showing the type of his attention, the strength of his different emotions, disposition to fatigue, memory and will energy, space-sense, time-sense, ability to learn, judgment, ability to discriminate, type of imagery—all measured with mathmatical accuracy, as a result of standard examinations which have been worked out by the psycholtechnician for the contemplated employment.

As an illustration of this process of examining the mental process of the individual, Prof. Munsterberg discusses the investigations and experiments which for the past year he has been making in the interest of electric railway service. The increase in the number of accidents due to the fault of motormen of the street railways prompted the American Association of Labor Legislation to call in vocational specialists last winter for a discussion of the problem of these accidents. Much attention was given to the problems of fatigue, to the various hours of the day and the time of labor, but there was a decided tendency to emphasize the importance of the whole mental makeup of motor men. At the suggestion of the association, Prof. Munsterberg undertook the psychological analysis of the problem, and the method of his procedure, together with the results which he obtained, is offered as a tentative basis for the new science of psychotechnics in fitting the right man to the right work. He says:

Certain indispensable single functions, like sharpness of vision, are examined before the entrance into the service, and so they cannot stand as characteristic conditions of good or bad service among the actual employes.

For this reason, in the case of the motormen, I abstracted from the study of the single elementary functions, and turned my attention to that mental process which, after some careful observations, seemed to me the really central one for the problem of accidents. I found this to be a particular, complicated act of attention by which the manifoldness of objects, the pedestrians, the carriages, the automobiles, are continuously observed with reference to their rapidity and direction in the quickly changing panorama of the street. Moving figures come from the right and from the left toward and across the track, and are imbedded in a stream of men and vehicles which moves parallel to the track.

In the face of such manifoldness there are men whose impulses are almost inhibited and who instinctively desire to wait for the movement of the nearest objects; they would evidently be unfit for the service, for they would drive the car too slowly. There are others who, even with the car at high speed, can adjust themselves for a time to the complex movngi situation, but whose attention soon lapses, and while they are fixating a rather distant carriage, may overlook a pedestrian who carelessly crosses the track immediately in front of their car. In short, we have a great variety of mental types of this characteristic unified activity, which may be understood as a particular combination of attention and imagination.

To transplant this activity of the motormen to the laboratory was the problem in hand. The obvious way would be to reproduce a street railway, with moving vehicles and pedestrians in miniature. But as Prof. Munsterberg points out, a reduced copy of an external apparatus may arouse a set of impulses, ideas and feelings entirely different from those aroused by the original, as is well illustrated from the naval courts, where ship collisions are demonstrated by means of small models and where old and seasoned helsmen become entirely confused when they have to indicate by small models the relative positions of the ships. On this the professor writes:

I feel inclined to say from my experience so far that experiments with small models of the actual industrial mechanism are hardly appropriate for investigations in the field of economic psycohlogy. The essential point for the psychological experiment is not the external similarity of the apparatus, but exclusively the inner similarity of the inner attitude. The more the external mechanism with which or on which the action is carried out becomes schematized, the more the action itself will appear in its true character.

Prof. Munsterberg's apparatus for the experiment consisted of a series of twelve cards, each provided with a handle, lying one above the other in a black box, covered with a black velvet belt in the centre of which a small window moves over the top card, showing only a portion of it at a time. The top card is withdrawn when the window opening has covered the entire area of the card, thus simulating the forward movement of the trolley car. Each card presents the complex problems which the motorman faces from his stand in the car. The card is 9½ inches broad and 26½ inches long. Two heavy lines half an inch apart extend lengthwise through the centre of the card. The space on either side is divided into small half-inch squares which are considered as the unit:

The squares on either side are filled in an irregular way with black and red figures of the three first digits. The digit 1 always represents a pedestrian who moves one step, from one square to the next; the digid 2, a horse, which moves twice as fast, that is, two squares; and the digit 3, an automobile, which moves three squares at a time. The black digits represent the men, horses and automobiles which move parallel to the track; the red digits are the dangerous ones. They move from either side across the track.

The idea is for the man who is being experimented on to indicate as quickly as possible as the moving cards present the spectacle of the street, those points on the track which are threatened by the red figures, that is, those places in the 26 half-inch units of the track which are lettered from A to Z, at which the red figures would land if they make the steps which their number indicates. A red digit 3, for example, which is 4 steps from the track, would not reach the track until the car had passed, and is, therefore, to be disregarded. A red 3, which is only 1 or 2

steps from the track, would also be unimportant, because its single move, including 3 steps or units, would carry it across the track. But a red 3, which is 3 units from the track, or a red 1, which is 1 square from the track, would land on the track itself. The aim is to find these points quickly.

The subject of the experiment turns the crank himself, regulating the speed to suit the quickness of his appreciation. He calls the numbers of the cards and letters which indicate the danger points and the experimenter notes them down, and measures the number of seconds required for the whole experiment. The result of the experiment therefore shows three things; the number of seconds, the number of omissions, that is, of places at which red figures would land on the track which were not noticed by the subject; and, thirdly, the number of incorrect places where letters were called, in spite of the fact that no danger existed.

Of course the subjects for the experimentation became thoroughly familiar with this apparatus before the final test was applied. A number of motormen were selected from a large electric railway company who for twenty years had been the best in the service. A second group were made up of men who had barely escaped dismissal and whose records were characterized by many more or less important collisions or other accidents, while a third class was made up of men in the middle field, employes who were neither good nor bad. Prof. Munsterberg says:

The test of the method lies first in the fact that the tried motormen agreed that they really pass through the experiment with the feeling which they have on their car. The necessity of looking out in both directions, right and left, for possible obstacles, of distinguishing those which move toward the track from track, the steady forward movement of the observation point, the constant temptation to give attention to those which are so near that they will cross the track before the approach of the car — in short, the whole complex situation with its demands on attention, imagination, and quick adjustment, soon bring them into an attitude which they themselves feel as identical with that in practical life.

On the other hand, the results show a far-reaching correspondence between efficiency in the experiment and efficiency in the actual service.

The chief difficulty of this experiment is to reduce the result to figures, to balance the number of seconds with the number of omissions with mathematical accuracy. The Harvard scientist puts it thus:

No one has gone through those 12 cards in a shorter time than 140 seconds, while the longest time was 427 seconds. On the other hand, no one of the motormen made less than four omissions, while the worst ones made 28 omissions. On the whole, the time fluctuates between 180 and 420 seconds, the mistakes between 4 and 28. The aim is to find a formula which gives full value to both factors and makes the material directly comparable in the form of one numerical value instead of the two.

Evidently we balance both factors if we multiply the number of omissions by 10 and add them to the number of seconds. The variations between 4 and 28 omissions are 24 steps, which multiplied by 10 correspond to the 240 steps which lie between 180 and 420 seconds. On that basis, any additional 50 seconds would be equal to 5 additional omissions. If of two men, one takes 100 seconds less than his neighbor, he is equal to him in his ability to satisfy the demands of the service, if he makes 10 mistakes more.

On the basis of this calculation, I find that the old, well-trained motormen come to a result of about 450, and I should consider that an average standard. This means, that a man who uses 400 seconds would not be allowed to make more than 5 omissions, in 350 seconds not more than 10, in 300 not more than 15, in 250 not more than 20. Where there are more than 20 omissions made, mere quickness ought not to be allowed as a substitute. The man who takes 150 seconds and makes 30 mistakes would come up to the same standard level of 450. And his characteristics would probably not serve the interests of the service. He would speed up his car and make better time than anyone else, but would be liable to accidents.

With men on the educational level and at the age that comes in question for their first appointment in the service of an elec-

tric railway company, the test proposed ought to be applied according to this scheme. If they make more than twenty mistakes, they ought to be excluded; if they make less than twenty mistakes, the number of omissions is to be multiplied by ten and added to the number of seconds. If the sum is less than 350, their mental fitness for the avoidance of accidents is very high, between 350 and 450 fair, and more than 550 not acceptable under any conditions. . . . .

There can be no doubt that these experiments could be improved in many directions. But even, in this first not adequately tested form, an experimental investigation of this kind which demands from each individual, hardly ten minutes would be sufficient to exclude perhaps one-fourth of those who are nowadays accepted in the service as motormen. This 25 per cent. of the applicants do not deserve any blame. In many other occupations they might render excellent service; they are neither careless nor reckless, and they do not act against instructions, but their psychical mechanism makes them unfit for that particular combination of attention and imagination which ought to be demanded for the special task of the motorman.

If the many thousands of injuries and the many hundreds of death cases could be reduced by such a test at least to a half, then the conditions of transportation would have been improved more than by any alterations in the technical apparatus, which usually are the only objects of interest in the discussion of specialists. . .

The whole world of industry will have to learn the great lesson, that, of the three great factors—material, machine and man—the man is not the least, but the most important.

Prof. Munsterberg would provide examinations, similarly detailed, for every industry. Many industries would not require the elaborate apparatus that has been used in the case of the electric railway service, as for instance, the telephone service. With a view to applying the psychological test to cases where many mental activities are in play, Prof. Munsterberg experimented upon a set of thirty young women who had just entered the telephone training school.

Although a complex case, the examination of the telephone operator's fitness for the work was fairly simple. According to Prof. Munsterberg, fourteen separate psychological processes are necessary in the typical case of the telephone operator from the moment when the speaker takes off the receiver to the cutting of the connection.

The tests referred to memory, attention, intelligence, exactitude, and rapidity. The attention test was perhaps the most significant. Each subject was given the first page of the morning newspaper, the newness of the contents securing the desired distraction of attention, and at a given signal each girl had to cross out every "a" in the text for the next six minutes. This experiment resulted in showing, first, how many letters are correctly crossed out; secondly, how many were overlooked, and thirdly, how the recognition and the oversight were distributed throughout the text. Professor Munsterberg says:

The third test, which was tried with the whole class, referred to the intelligence of the individuals. How to test intelligence in general is a chapter of the psychology of tests which, especially in the service of pedagogy, but to a certain degree also in the service of medicine, has been more carefully elaborated than any other. Often it has been contested whether we have any right to speak of one general central intelligence factor, and whether this apparently unified activity ought not to be resolved into a series of mere elementary processes. The newer pedagogical investigations, however, speak in favor of the view that besides all special processes. . . . an ability must be recognized which cannot be divided any further and by which the individual adjusts his knowledge, his experiences, and his dispositions to the changing purposes of life.

Prof. Munsterberg's method of discovering this essential intelligence centre is to read to his subjects a series of pairs of words, logically connected, long enough so that the experiment is not a mere memory test. Later one word of each pair is read to them, and they are required to write the word which belonged with it in the pair. The tests show that when disconnected words are used no one can keep the series in mind, but when the words are

related in meaning the most intelligent pupils can master the whole series.

The accuracy of movement impulses was determined by an experiment which required that every one try to reach with the point of a pencil three different points on a sheet of paper in the rhythm of metronome beats. This test was introduced because the hitting of the right holes in the switchboard of the telephone office is of great importance.

This method of examination of the employee's "psychical rhythm," will do much, in Prof. Munsterberg's opinion, to bring order to the haphazard method of shifting workers within an industry which calls for varied psychophysical activities. He adds:

In a pencil factory the women in one department have to grasp with one movement, a dozen pencils, no more and no less. Some learn this at once without effort; others never can learn in spite of repeated trials. If those who fail in this department are transferred, for instance, to the department where the gold-leaf is most carefully to be applied to the pencils before stamping, very often they show great fitness in spite of the extreme exactitude needed for this work. . . . .

But even in the large concerns in which many kinds of labor are needed side by side, it is not the rule but a rare exception when the individual is systematically shifted to the psychologically correct place. And so far, in most factories, the laborer who is not doing well simply loses his position, and by such an unfortunate experience he is not mentally enriched but impoverished, as he has lost much of his self-confidence and of his joy in labor.

If the limitless waste of human material, this pitiable crushing of joy in the day's work, and this crippling of the economic output is at last to be reduced, indeed nothing is more needed than a careful scrutiny of the various psychological functions involved in the work.

Prof. Munsterberg seeks by his methods of phychotechnics, not only the best possible man, but the best possible work. The psychologist who has been caught up in this wave of scientific management has already made practical contribution to the cause of movement. The Taylor system, which by discovering the perfect movement of shoveling, raised wages two-thirds and reduced expenses one-half in the great Bethlehem Steel Works, has been applied in many different directions.

But Prof. Munsterberg would call in the psychologist to regulate all the surroundings of the workers, to determine the amount of attention distraction from certain noises, to regulate the height of the chairs which the workers might declare were perfectly satisfactory, to substitute colors for vertical and horizontal lines, to determine the physical and social influences on the workers of any industry, such as the effect of the time of the year, the time of day, the length of labor, of temperature, of stimulants, all of which, according to him, have much more than a mere physical effect.

Experiments made by Prof. Munsterberg in this connection with regard to the problem of monotony should serve to pull up rather short the well intentioned factory investigators who picture the joylessness of standing all day at a machine, repeating the same dreary motion, from one year's end to the other. The division of labor which had proceeded by long leaps far beyond the reaches of Adam Smith's imagination is often represented to us as the cause of an injurious mental starvation. Monotony—Prof. Munsterberg says they like it, chiefly because it isn't monotony.

Prof. Munsterberg carefully separates the problem of monotony from that of fatigue, however, limiting monotony to "that subjective dislike of uniformity and lack of change in work. He writes

For a long while I have tried to discover in every large factory which I have visited the particular job which, from the standpoint of the outsider, presents itself as the most tiresome possible.

As soon as I had found it I had a full, frank talk with the man or woman who performed it, and earnestly tried to get selfobservational comment. In an electrical factory, with many thousands of employees, I gained the impression that the prize for monotonous work belonged to a woman who packs incandescent lamps in tissue paper. She wraps them from morning until night frm the first day of the year to the last, and has been doing that for the last twelve years. She performs

this packing process at an average rate of 13,000 lamps a day. The woman has reached about 50,000,000 times for the next lamp with one hand and with the other to the little pile of tissue sheets and then performed the packing. . . . As long as I watched her she was able to pack twenty-five lamps in forty-two seconds, and only a few times did she need as many as forty-two seconds. Every twenty-five lamps filled a box, and the closing of the box required a short time for itself.

She assured me that she found the work really interesting and that she constantly felt an inner tension, thinking how many boxes she would be able to fill before the next pause. Above all, she told me, there is entinuous variation. Sometimes she grasps the lamp or paper in a different way, sometimes the packing itself does not run smoothly, sometimes she feels fresher, sometimes less in the mood for the work, and there is always something to observe and something to thing about.

Another, a man, whose task for fourteen years had been to feed a machine with strips all day long, declared that his work was stimulating and interesting. He continues:

At the beginning the work had been sometimes quite fatiguing, but later he began to like it more and more. I imagined that this meant that at first he had to do the work with full attention and that the complex automatic. . . . But he explained to me in full detail that this was not the case, that he feels obliged to devote himself entirely to the work at hand, and that he is able only under these conditions to bring in the daily wage which he needs for his family, as he is paid for every thousand holes that the machine cuts in the strips. But he added especially that it is not only the wage which satisfies him, but that he takes decided pleasure in the activity itself.

A series of laboratory experiments resulted in the conclusion that labor which involves much repetition should be performed by people whose mental dispositions offer an easy grasp of successive uniform impressions. Prof. Munsterberg offers a definite method for determining the readiness for this grasp in order to secure the selection of fit workmen for the particular task and do away with the complaint of monotony.

He applies the results of his laboratory work to the finished prduct of industry, to the effect itself, which is, after all, the ultimate consideration. Psychology has already invaded the fields of advertising, of window display, of buying and selling, but the professor turns it quite ingeniously into a new path and suggests a very present help for our problem of patents.

By a definite psychological test he would exclude from the market the deceiving imitation of a patented article. This invloves the measurement of the exact amount of similarity which may exist between a typewriter or an automobile or a mineral water and the imitation of it. He explains as follows:

In theory there is substantial agreement that infringement occurs when the marks, names, labels, or packings of one trader resemble those of another sufficiently to make it probable that ordinary purchasers exercising no more care than such persons usually do in purchasing the article in question will be deceived.

This, of course, leaves the deceision as to how much care the ordinary customer takes in purchasing articles rather hazily to trade experts and judges. In order to construct a scale by which similarity between objects may be measured, Prof. Munsterberg offers an experiment which consists in observing a group of objects for a definite interval and succeeding the observation with that of another slightly different group. Picture postal cards are used for this experiment thus:

Two cards with Christmas trees, or two with Easter eggs, two with football heroes, and so on, may differ all the way from a slight variation of colors or a hardly noticeable change in the position of details to variations which keep the same motive or the same general arrangement, but, after all, make the card strikingly different. The first step is to discover for each pair the degree of similarity on a percentage basis. To overcome mere arbitrariness we ask thirty to forty educated persons to express the similarity value, calling identical postal cards 100 per cent. and a black picture of a street scene 0. The average value of these judgments is then considered as expressing

the objective degree of similarity btween the two pictures of a pair.

Groups of cards are then shown in succession; for instance, six made up of a landscape, a building, a head a general scene and so forth. After twenty seconds the same group is shown, but a slightly different landscape is substituted for the first one.

If the substituted picture has the average similarity value of 80 per cent. and we make the experiment with ten persons, the substitution may be discovered by seven and remain unnoticed by three. We can now easily vary every one of the factors employed. If, instead of six cards, we take ten, it may be that only four out of ten persons, instead of seven, will discover the substitution. . . . If we show the six cards only for two seconds, instead of five seconds, the number of those who recognize the difference may sink from seven to five or four. . . . .

If these experiments are varied sufficiently and a large mass of material brought together, we must be able to secure definite formulae. We may find that if the critical card appears among six cards, is shown for five seconds, and the group again exposed after twenty seconds, 80 per cent. of the subjects will recognize the substitution of asimilar card, if the degree of similarity is 30 per cent., only 60 per cent. will recognize it if the degree of similarity is 70 per cent., and only 30 per cent. will recognize it if the degree of similarity is 90 per cent.

In this manner the degree of similarity between a new typewriter and its imitation could be measured.

If such methods were accepted by the trade and the courts, it would only be necessary to agree on the percentage of simiuncertainty would disappear. There would larity which ought to be permitted, and all be no wrangling of opposing interests, it would be possible to find out whether the permitted limit were overstepped or not with an exactitude similar to that with which the weight or the chemical constitution of a trade commodity is examined.

Prof. Munsterberg refuses to countenance the use of the experimentation in the hands of lawyers and district attorneys. He says:

If in the future the courts were ever to accept such psychological experimental methods, it would be intolerable dilettantism if such experiments were carried on by lawyers and district attorneys. It is as true of this economic legal question as of many other legal psychological problems that its introduction into the court room can become desirable only when phychological experts are engaged and called in the same way as chemical or medical experts are invited to the court.

He looks forward to the bright day when at least in the United States there will be a Governmental bureau of applied psychology, and remarks:

If experiments, for instance, with laborers in a factory or employees of a railway are to advance beyond the first faint efforts of to-day and are really to become serviceable to the cultural progress of our time with effective completeness, they ought not to remain an accidental appendix to the theoretical laboratories.

Either the universities must create special laboratories for applied psychology or independent research institutes must be founded which attack the new concrete problems under the point of view of National political economy. Experimental workshops could be created which are really adjusted to the special practical needs and to which a sufficiently large number of persons could be drawn for systematic researches.

The ideal solution for the United States would be a Governmental bureau for applied psychology, with special reference to the psychology of commerce and industry, similar to the model agricultural stations all over the land under the Department of Agriculture.

Only when such a broad foundation is secured will the time be ripe to carry the method systematically into the daily work. The aim will never be for real experimental researches to be performed by the foreman in the workshop or by the Superintendent in the factory. But slowly a certain acknowledged system of rules and prescriptions may be worked out which may be used as patterns, and which will not presuppose any scientific knowledge, any more than an understanding of electricity is necessary for one who uses the telephone.

This will, of course, create the demand for the psychologist specially trained to solve the problems of special industries and who will be employed as chemist or physicist. A new specialization of our industrial life would be introduced by the psychological engineer. Says the advocate of this system:

Some of these would devote themselves to the problems of vocational selection and appointment; others would specialize on questions of advertisement and display and propaganda; a third group on problems of fatigue, efficiency, and recreation; a fourth on the psychological demands for the arrangements of the machines, and every day would give rise to new divisions.

Institute economic psychotechnics in our social life, adds Prof. Munsterberg, and our future seems rosy indeed. He says in conclusion:

We must not forget that the increase of industrial efficiency by future psychological conditions is not only in the interest of the employers, but still more of the employees; their working time can be reduced, their wages increased, their level of life raised.

And above all, still more important than the naked commercial profit on both sides, is the cultural gain which will come to the total economic life of the Nation, as soon as every one can be brought to the place where his best energies may be unfolded and his greatest personal satisfaction secured.

The economic experimental psychology offers no more inspiring idea than this adjustment of work and psyche by which mental dissatisfaction in the work, menthal depression and discouragement, may be replaced in our social community by overflowing joy and perfect inner harmony.

The THIRTEENTH ANNUAL CONVENTION

—OF THE—

Canadian Association for the Prevention of Tuberculosis

will meet in Ottawa under the Presidency of the Hon. Adam Beck,

—ON—

MARCH 12th and 13th, 1913

His Royal Highness the Duke of Connaught has intimated his intention to be present.

The meetings will be open to the public.